## NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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► MICRO-TO-MAINFRAME

#### **Network links fade**

Product hype makes users yawn.

BY PAUL KORZENIOWSKI Senior Editor

Microcomputer-to-mainframe link vendors are still trying to make good on product claims made a few years ago, but users don't seem to care. Link products once rode the crest of a massive publicity wave, inspired by companies that proclaimed their products would supply microcomputer users with easy access to mainframe data.

But once users began working with the products, they discovered a number of serious limitations. The products did not support true information sharing, were hamstrung by slow transmission speeds, were unable to access a va-See Link page 53

Vendors resurface micro-to-mainframe road



► INDUSTRY INSIGHTS

#### RCA guillotines two key services

Cost-cutting moves affect 1,200 users.

BY PAM POWERS

Senior Editor

PRINCETON, N.J. — Like a prisoner in a shrinking room, RCA Corp. is succumbing to competitive pressure from all sides. The giant communications industry stalwart said last week it will dismantle two of its largest communications services.

The services affected are the Data Transaction Services unit, commonly known as RCA Cylix, and the Private Leased Channel Services unit. Both are controlled by RCA American Communications (American). The 1,200 users affected

will have to find service alternatives by May 1987, the date the RCA services are scheduled to be phased out, unless an employee takeover now afoot is successful.

RCA has gained leviathan status over the years by virtue of its age and the breadth of its services, but recently attention has been focused on the company's sluggish financial performance.

General Electric Corp.'s December 1985 acquisition of RCA sparked speculation that some unprofitable segments of RCA's operations would be axed. Last week, GE merged the two companies' communica-

See RCA page 52

► SERVICE SHARING

## The Equitable proves profit in shared tenant services

BY MARGIE SEMILOF

Senior Writer

NEW YORK — The Equitable Life Assurance Society of the United States is a huge success in the less-than-stellar market for shared tenant services. By installing itself as its own

anchor tenant and leasing office space within its own facilities, the life insurance giant turned its telecommunications department into a booming profit center.

The Equitable currently provides voice services, including discount long-dis-

tance service, disaster backup, electronic mail and voice mail from its modular AT&T System 85 private branch exchange, to such tenants as the Whitney Museum and Ernst & Whinney.

Victor Owens, vice-president of The Equitable Infor-See Equitable page 52

#### NETWORK LINE

News

The TCA conference serves as the forum for product debuts and pleas for user involvement. Attendees find themselves at the hub of a whirl of activity. Page 2.

AT&T comes up with an alternative to Wats. The new service is said to offer simplicity,

flexibility and more freedom for callers. Page 2.

Wang Laboratories edges closer to the integration of its voice and data product lines by laying out upgrades to its minlcomputers and digital private branch exchanges. Page 4.

Uncle Sam is low on luck in attempts to get state regulators to check out the Bell operating companies' rates of return. Even potential savings for ratepayers haven't put a dent In the lethargy of 11 states and the District of Columbia. Page 6.

Sytek struggles to make up for the dollars lost along with Big Blue's OEM contract. Page 7.

Forging forward with its Network of the Future, AT&T reveals the results of the yearlong field test of its wideband, packet-switched service project. Page 52.

#### Features

Despite the convenience and savings of teleconferencing, electronic meetings haven't taken off. Some managers will seek any excuse for a face-to-face talk. Page 37.

#### FEATURE FOCUS

## Are stock trading pits passe?

Traders are reacting to market trends at high speeds.

BY MARGIE SEMILOF Senior Writer

While diehard Wall Street stock traders still prefer the visceral stimulus of a noisy, crowded stock exchange floor, or "pit," many specialized and regional exchanges today are characterized by the quiet hum of new communications technology. Ticker tapes and mechanical printers are long gone, and networks based on high-speed data circuits are expediting transactions and changing the very nature of the investment game.

Continued on page 34



#### ► NETWORKERS ASSEMBLE

#### Users blitzed by industry glitz at TCA

BY BOB WALLACE

SAN DIEGO — There was hardly time for visitors to the Tele-Communications Association's (TCA) 24th annual conference here to catch their breath amid the whirlwind of activity last week. A cornucopia of new product and service announcements, pleas for greater user involvement in regulatory matters and the plight of long-haul

carriers were among the varied concerns that vied for attendees' attention at the user organization's six-day event.

In his keynote address, former Federal Communications Commission Chairman Richard Wiley urged users to shoulder greater responsibility in steering communications policy. Wiley, now a senior partner with the Washington, D.C. law firm of Wiley & Rein, said users should aid in the drafting of communications legislation and participate in FCC regulatory actions.

Wiley also spoke of the plight of long-haul carriers competing with AT&T. Wiley said the FCC has turned a deaf ear to the so-called other common carriers which, he claimed, are roughly 50 years behind AT&T in terms of network construction. "The OCCs must acquire a larger share of the communications services market," he said. "But they face tremendous transitional problems as they try to construct their networks.

Wiley asserted that TCA members must continue their efforts to promote competition in the longdistance services marketplace.

A diverse group of long-haul carriers announced moves aimed at

bolstering their positions in the domestic and international communications services marketplaces. The group announced network expansions, international communications services and price reductions. They included MCI Communications Corp., US Sprint Communications Co., ITT Corp., Western Union Corp., Cable and Wireless of North America, Starnet Corp. and Lightnet, Inc. (See "Carriers outline plans," page 6.)

Users attending the show were also blitzed by vendors who introduced an assortment of network managment gear and a plethora of data networking components. Vendors announcing equipment designed to add depth to their network management and control product lines included Infinet, Inc., Paradyne Corp., Racal-Vadic, Inc., Case Communications, Inc. and Atlantic Research Corp.

As expected, Northern Telecom, See TCA page 54

#### ► NETWORK MANAGEMENT

#### MCI leads TCA barrage with net control products

BY MARY PETROSKY

West Coast Correspondent

SAN DIEGO — In response to user demands for more control of voice and data networks, vendors at the Tele-Communications Association (TCA) annual conference here last week emphasized network management and control in a slew of new product introductions.

MCI Telecommunications Corp. led the pack with the introduction of a call and network management service, Base-1, designed for large telecommunications users with multiple sites. Base-1 provides centralized call and network management across dissimilar private branch exchanges and a range of carriers.

To implement the service, users connect a device that MCI calls a

pollable call storage unit (PCSU) to each PBX in an organization. The MCI devices, which are attached via a station message detail recording port, are compatible with switches from Rolm Corp., Northern Telecom, Inc. and AT&T.

MCI will poll users' PBXs from a central processing facility, process the call information and generate reports. Customers can access a range of daily reports — including traffic, call recording and alarm list reports — using their own terminals and an MCI 800 number. Alarms will be monitored on a 24hour basis and routed to wherever the user designates.

MCI has not yet set a price for the service, but the fee will be competitive with service bureaus, according to John Wolaver, director See MCI page 54

► AT&T LONG DISTANCE

#### **Wats alternative bows**

Eliminates need for dedicated lines.

BY KARYL SCOTT

WASHINGTON, D.C. — AT&T recently proposed a service alternative to Wats that is aimed at medium-sized business customers and does away with traditional Wats pricing methods and the need for dedicated Wats access lines.

Custom Switched Network Service (CSNS), which is intended for businesses that make 25 to 1,000 hours of long-distance calls per month, looks like basic Direct Distance Dialing service with the added benefit of volume discounts, an-

The beauty of the service, according to AT&T spokesman Ralph Dobriner, is its simplicity and flexi-

Customers, for example, can use switched CSNS lines to call anywhere in the country, while Wats lines are dedicated to serving certain geographic regions, or bands.

Because CSNS doesn't require dedicated access, customers can make and receive local, interstate, intrastate or international calls over the same AT&T service lines. This enables CSNS customers to establish service quickly in response

to business needs, a feature that is particularly important to businesses that have to deal with seasonal changes in calling patterns.

CSNS also provides detailed billing, as opposed to Wats billing, which only provides customers with the total number of minutes

There are two options available with the proposed tariff. Option I carries a flat fee of \$115 per month and is designed for customers who make between 25 and 200 hours of calls per month. Option II is designed for users making between 200 and 1,000 hours of calls and has a flat monthly fee of \$450.

Calls are billed in six-second increments at roughly 25 cents to 28 cents per interval, and the service has a one-time service charge of \$1.

See Wats page 56

#### Correction:

The article "AT&T merger under way" (Network World, Sept. 8) incorrectly stated the name of the AT&T group headed up by W.F. Buehler. Buehler is responsible for the Special Markets

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#### **NEW PRODUCTS AND SERVICES**

Racal-Milgo unveiled a monitor for Dataphone Digital Service networks supporting secondary channels. Page 25.

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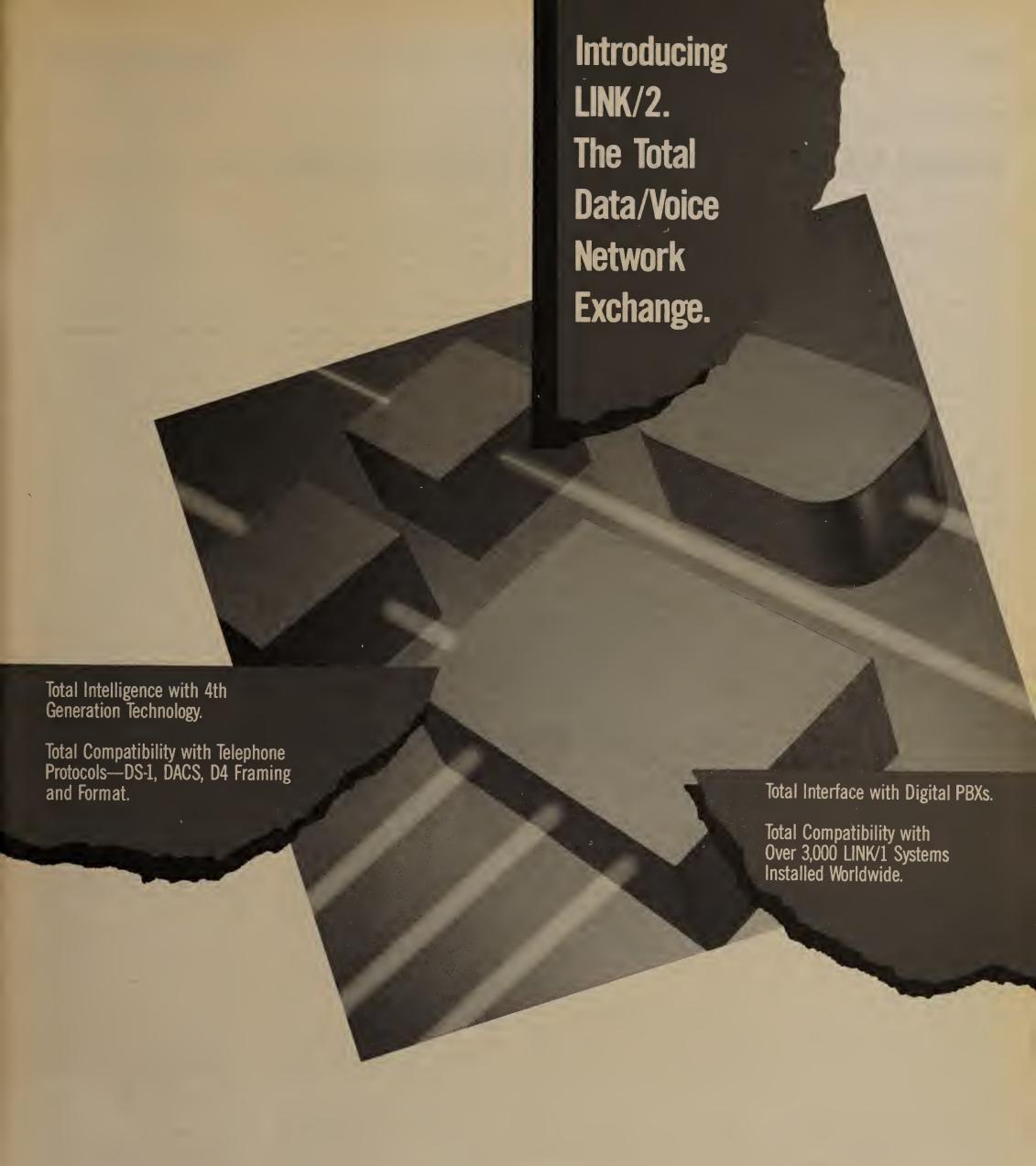
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#### ► VOICE/DATA LINKS

#### Wang VS hooked to PBX

System unifies electronic and voice mail.

BY MARGIE SEMILOF

Senior Writer

LOWELL, Mass. — Wang Laboratories, lnc. moved a step closer to integrating its voice and data product lines last week with the introduction of product enhancements and a system link for the company's minicomputers and digital private branch exchanges.

The new features put teeth into the previously announced Wang In-

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formation Office Solution (Wios), an integration strategy designed to tie the company's VS minicomputer line with the Wang Business Exchange (WBX), the company's lowend PBX.

The VS-to-WBX Control Link is an integrated voice and data link that enables users to perform a variety of communications functions from either the VS or the WBX. It will allow, for example, some VSbased applications to take advantage of WBX capabilities.

Features of the link include automatic dialing from the keyboard of VS workstations and the ability to activate a message-waiting light on a Wios Wang Station Set to provide notification of electronic mail delivery. The Wang Office Message Notification feature reportedly eliminates the need for users to log on to the VS to check for messages.

Directory integration is also included in the latest release of Wios. The function synchronizes user directories on the VS and WBX, reflecting updates and changes made on either system. For example, a new employee added to a WBX directory is also added to a Wang Office directory. Directory integration allows the communications manager to manage both the VS and WBX from a single VS workstation.

A new call accounting feature dubbed the VS Call Management Facility provides station message detail recording. It enables VS users to gather information about telephone calls, such as the number called, date and time calls were made and call duration. The call accounting capability also incorporates rate tables that assign cost to a long-distance phone call.

Two voice mail options were added to the WBX. They include Wang Office/Voice Mail, which is targeted at Wios users, and WBX-DVX-60, a voice messaging system aimed at customers using the WBX as a stand-alone product and wishing to add voice messaging capability. The Wang Office/Voice Mail product integrates voice messaging with text messaging capabilities used in Wang Office.

An additional feature called Automated Attendant, which enables callers to dial into phone extensions without going through a

See Wang page 53

#### ► INTERCONNECTIVITY

#### **Link builds Mac muscle**

BY MARY PETROSKY

West Coast Correspondent

SAN DIEGO — Networking tools unveiled by Northern Telecom, Inc. and Apple Computer, Inc. at the Tele-Communications Association annual conference here last week greatly expand the interconnectivity of Apple's Macintosh, but reduce the microcomputer to the status of dumb terminal when communicating with host proces-

As expected, the jointly unveiled products allow Macintoshes to be linked to mini and mainframe computers as well as to IBM Personal Computers and compatibles through Northern Telecom's Meridian SL-1 private branch exchange. But file transfers between Macintoshes and host computers are not currently supported, said Bob McNinch, product manager for Ap-

As part of the announcement, Northern Telecom and Apple introduced a new version of the Intalk communications package from Palantir Software that supports communications through the SL-1. Inprovides file transfers between Macintoshes and IBMcompatible personal computers.

Macintoshes can communicate with Digital Equipment Corp. computers via the SL-1 with the use of Northern Telecom's Computer-to-PBX Interface. Macintoshes can be linked to minicomputers from Hewlett-Packard Co. via HP's Advanced Terminal Processor and Northern Telecom's Asynchronous Interface

Line Card. Northern Telecom also provides a protocol converter that gives Macintosh users dial-up access to IBM's System 36/38 and mainframes supporting 3270-type

Prior to this announcement, Apple's primary method for connecting Macintoshes to host computers was through dial-up modems and through Netway 1000, a product for the Appletalk network that emulates an IBM 3274 cluster controller. The latest version of Netway 1000 provides file transfer, McNinch said.

ln a related announcement, Northern Telecom introduced a new option for connecting IBM Personal Computers and compatibles via the Meridian SL-1.

The Nashville-based company is now supporting Server Technology, lnc.'s Easylan networking software on the SL-1.

Easylan supports peripheral sharing and file transfers for IBM Personal Computers and compati-

Easylan works with SL-1s configured for circuit switching, providing asynchronous data transfer over twisted-pair wiring at rates up to 19.2K bit/sec. The cost for connecting IBM Personal Computers and compatibles with Easylan over the SL-1 is less than \$100 per connection, according to Northern Te-

Telecom's Northern networking software, Lanstar PC, has been available since early 1985, said Jim Greenway, group product manager for networks. Z

Box 9171, 375 Cochituate Road Framingham, Mass. 01701-9171 617/879-0700

Editor
Bruce Hoard
Managing Editor
John Gallant Features Editor Steve Moore Associate Editors Kathleen M. Cahill Lisa Guisbond **Senior Editors** John Dix
Paul Korzeniowski
Pamela T. Powers
Senior Writers
Margie Semilof
Bob Wallace Staff Writers Michael Fahey, Nadine Wandzilak New Products Editor

Jim Brown
Washington, D.C. Correspondent
Karyl Scott
1273 National Press Building

1273 National Press Building
529 14th Street NW
Washington, D.C. 20045
West Coast Correspondent
Mary Petrosky
3350 West Bayshore Road
Suite 201
Palo Alto, CA 94303
Assistant Features Editors
Christine Casatelli
Robert Mitchell
Copy Editors
Josh Gonze
Peter Hoffmann
Beth Lazarus
Art Director **Art Director** Dianne Gronberg

Informational Graphics Designer
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#### ► WESTERN UNION

#### **Ex-stalwart seeks buyer**

**BY PAM POWERS** 

Senior Editor

UPPER SADDLE RIVER, N.J. — Struggling against a debt-ridden balance sheet, Western Union Corp. moved recently to sell control of the corporation to two financial services organizations, one of which may try to sell portions of Western Union's vast communications network.

Pacific Asset Holding, L.P. and MDC Holdings, Inc. have agreed to invest \$250 million in Western Union in exchange for company securities.

The deal is contingent on several conditions.

Pacific Asset, which would hold the majority of the seats on the Western Union board, is reportedly considering selling parts of the company's vast transcontinental

Wats from page 2

There is also a 30-second minimum billing period for each call.

AT&T said in its tariff filing that the service will be on the average 5% to 10% more expensive than Wats, depending on calling patterns.

"The individual customer will have to make a cost/benefit comparison, but based on our conversations with customers, they are willing to pay more for the features this new service offers," said Robert Garrett, district manager for long-distance services at AT&T.

AT&T will earn an estimated \$2.5 million profit in 1988 from CSNS, and the company may recapture customers in this market segment previously lost to competitors

According to material filed by AT&T with the Federal Communications Commission, the company "has lost approximately 10,000 Wats customers in the mid-sized business segment to competition."

Interestingly, AT&T hopes it can stem the tide of defections by providing feature-rich services, instead of combating competitors on cost. AT&T's motivation in offering CSNS is to offset the increasing cost of special-access fees it pays local exchange carriers for dedicated-access lines used with Wats, according to Robert Ellis, president of the Aries Group, based in Rockville, Md.

Over the past several years, special-access charges have risen tremendously, explained Jerry Harder, senior consultant with Telco Research Corp. of Nashville.

In comparison, the cost of switched access has steadily declined.

The lower rates that AT&T will be able to realize will be passed on to all of its switched-service customers, according to AT&T.

If approved by the FCC, the service is expected to go into effect Nov. 2, with a phased-in introduction throughout 1987.

network to bolster the financial picture, sources said.

Western Union has its roots in 19th-century America, a claim few other communications companies can make.

The business has evolved from basic telegram delivery to encompass a broad range of consumer and business communications services.

Consumer services include traditional telegram, mailgram and money transfer offerings.

Business communications services include telex, an electronic

mail service called Easylink, private-line services, long-distance telephone services, contract maintenance and satellite communications services.

A spokesman for Western Union said that telex contributes the highest percentage of Western Union's annual revenue.

The network supporting these services includes an 11,000-mile transcontinental microwave system, three satellites and seven major earth stations integrated with a packet transport network, a telex circuit-switching network and a long-distance telephone network.

Despite Western Union's attempts to penetrate new markets, the company has sustained large losses in recent years.

Its fiscal year 1984 revenue of \$1.049 billion netted losses of \$58 million.

Revenue dropped to \$983 million in 1985 and net losses mounted to \$367 million.

In the six months ending June 30, 1986, revenue totaled \$455 million, down from \$515 million during the same period last year.

Neither Western Union nor Pacific Asset would divulge future plans for the ailing company.

When asked whether the network will be sold, a Pacific Asset spokesman said, "All options will be considered and evaluated."

It is popular opinion that parts of the network may be sold, perhaps to a large user, in order to recover some losses.



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#### ► NETWORKERS ASSEMBLE

#### **Carriers outline plans,** service progress at TCA

Fiber optics lead show product parade.

**BY BOB WALLACE** 

Senior Writer

SAN DIEGO — When the Tele-Communications Association was formed in 1961, none of its members would have believed its 25thannual meeting would attract more than 10 long-haul carriers and talk on the show floor would be of glass transmission systems.

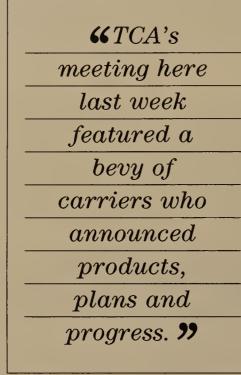
TCA's meeting here last week featured a bevy of carriers who gathered to announce products, plans and progress, the latter concerning fiber-optic network installation. Show highlights included:

A source from Starnet Corp., a former subsidiary of Ford Motor Co., told Network World the carrier would replace its satellite network with a fiber-optic net by mid-1987. Starnet was sold to American Network, lnc., a company now 28% owned by Ford Aerospace, the Ford subsidiary that formerly operated

The Starnet representative, requesting anonymity, said the company is negotiating with many carriers for fiber capacity. "We will phase out use of our satellites in an attempt to acquire and operate a total fiber-optic network by the middle of next year."

■ US Sprint Communications Co. claimed roughly half of its 23,000mile fiber-optic network has been

completed. More than 6,000 miles of the net are operational, according to Charles Brown, president of the carrier's Pacific division. Capacity on the fiber net, due to be completed by the end of 1987, will



be marketed to users, communications services resellers and regional carriers. Brown said the US Sprint network will feature 26 Northern Telecom, Inc. switches by mid-1987. About 30% of the carrier's net consists of leased lines that are

provided by AT&T.

Lightnet, Inc., a fiber-optic telecommunications services company, announced that it will begin offering T-1 service between 10 cities beginning Jan. 1, 1987. T-1 services will be offered along a fiber route that originates in New York and through travels Philadelphia, Washington, Pittsburgh, Cleveland, Detroit and Chicago.

■ MCI Communications Corp. announced its intention to offer International Business Service (IBS) through International Telecommunications Satellite Organization (Intelsat) satellite uplinks to be constructed in Los Angeles and San Francisco. The two Intelsat earth stations, which will be linked together with fiber-optic cable, are expected to be completed by late December. The expansion of the IBS service will be subject to the approval of the Federal Communications Commission.

In an effort to diversify the company's international communications services, MCI will offer highspeed communications over Tat-8, the first transatlantic fiber cable, from its points of presence in New York, Washington, D.C., Los Angeles and San Francisco to European nations. The services are scheduled to become available in 1988, an MCI spokesman said.

■ Cable and Wireless of North America, formerly TDX Systems, Inc., will market the U.S. segment of the Digital Highway, an international digital network proposed by Cable and Wireless plc in London. The U.S. group is constructing a 7,200-mile domestic network made primarily of fiber-optic cable.

■ American Satellite Co. inked a 10-See **Highlights** page 54 ► BOCS

#### Feds seek state aid in rate check

Rising phone costs spur investigation.

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — The federal government seems to be enjoying only limited success in its recently initiated crusade to spur state regulators to investigate the Bell operating companies' rates of

In June, the Department of Defense and the General Services Administration (GSA) jointly petitioned public utility commissioners in 33 states and the District of Columbia to examine BOC rates of return for the provision of intrastate telephone service. The federal agencies claimed that favorable economic conditions allowed the BOCs to earn higher-than-justified earnings. The petitions were filed on behalf of federal agencies operating in those states, in an effort to fight rising telephone rates.

To date, 11 states and the District of Columbia have refused to take action on the Defense Department/GSA request. The states include Georgia, Maine, Michigan, Mississippi, North and South Carolina, South Dakota, Montana, Arizona, Florida and Ohio. Five other states, including Massachusetts, Florida, Delaware, Utah and Illinois, have decided to initiate rate investigations on the basis of the petition and complaints filed by other users. Action on the federal request is pending in Idaho, Kentucky, Minnesota and Nevada.

Between 40% and 60% of total federal telephone expenditures stem from local service, said Mark Langsam, an economist with the GSA. "We are hopeful that, by this time next year, we will see some rate reductions as a result of all this activity."

While the federal agencies are disappointed that some states have decided not to cooperate in investigating BOC rates of return, they say other recent developments will help control rising telephone costs, according to Dale Coker, a Defense Department attorney on the case.

Prior to the GSA/Defense Department pleadings, the U.S. Supreme Court ruled that states may set their own depreciation rates for equipment used by telephone companies to provide interstate services. The court said states, many of which had wanted to set lower depreciation rates, do not have to follow Federal Communications Commission policy in this area.

As a result of the Supreme Court ruling, some states have ordered BOCs to refund money earned from rates based on the higher, FCCmandated depreciation rates. Z

➤ DIGITAL DEVELOPMENTS

#### Intel shows new ISDN micro chips

Products will interface non-ISDN equipment to future nets.

BY MICHAEL FAHEY

Intel Corp. last week introduced a chip component and support products for use in connecting non-Integrated Services Digital Network user equipment to ISDN-compatible networks.

Intel's 29C53 transceiver meets both the S and T standards set out by the Consultative Committee on International Telephony and Telegraphy for use in the future all-digital networks.

According to an Intel spokeswoman, typical applications will include terminals, terminal adapters and private branch exchange line cards. Terminal adaptors allow personal computers and terminals that are not ISDN-compatible to connect to an ISDN network. The 29C53 transceiver conforms to the 2B+D Basic Rate ISDN specification.

This standard, defined by the CCITT, defines two 64K bit/sec B channels for voice and data and one 16K bit/sec D channel for signaling. 29C48 coder decoder/filter

The company also introduced the 29C48 programmable coder decoder/filter, a very large scale integration component that converts analog signals to digital and vice versa. Because the 29C48 is programmable, designers can control important features of a digital telephone using software. Also, the equipment can be designed to perform comprehensive diagnostics by using the circuit's programmable loopback features.

The product, along with other Intel components, enables digital telephones and switching systems to be connected to ISDN-compatible networks, according to the company's spokewoman.

#### Two evaluation kits

In addition, Intel introduced the TEK29C53 terminal evaluation kit and the LEK29C53 line card evalution kit. The TEK29C53 evaluation kit is a board that includes the 29C53 transceiver, one of the company's programmable coder decoder/filter combination devices, a se-

rial communications controller, a microcontroller and software.

The board can be connected to a dumb teminal or a personal computer, and, through software, it can access all registers of the 29C53, thereby allowing designers to configure the device and monitor its status under different conditions, the spokeswoman said.

In related news, National Semiconductor Corp. of Santa Clara, Calif., and Thomson Semiconductor of Paris unveiled plans to jointly develop interface products for ISDN networks. The agreement will allow the two companies to pool their efforts to develop ISDN interface products, according to a National Semiconductor spokesman.

In addition to the joint development agreement, the companies agreed to give each other the right to second source products.

That agreement applies to National's Combo Il second-generation integrated coder decoder/filter, the company's digital line interface controller and Thomson's 1200 bit/sec modem. **∠** 

More news: page 52

#### LOCAL NETWORKS

#### Sytek proffers new network series

BY MARY PETROSKY

West Coast Correspondent

MOUNTAIN VIEW, Calif. — Sytek, Inc. is scheduled today to release a series of local network products designed to enable users to integrate network environments. The company is banking on this new strategy to help compensate for the loss of an IBM OEM contract that once provided half its revenue.

The new products interconnect Sytek's System 6000 personal computer network to the company's terminal-to-host network, other vendors' networks and IBM mainframe environments.

The new products support a version of Novell, Inc.'s Advanced Netware 2.0A operating system, which has been adopted to operate on Sytek's System 6000 network as well as a new network file server.

The company is also expected to introduce the 6420 Internetwork Bridge and the 6430 SNA Gateway for connecting the System 6000 with IBM hosts. The 6420 is designed to link the System 6000 with Sytek's asynchronous terminal networks, the System 2000 and Localnet20 as well as the System 3000, an IBM 3270 net product.

"As customers begin planning for large-scale introduction of personal computer networks into their organization, they are requiring that the networks interconnect with existing networks," said Joseph Seidler, vice-president of product marketing.

The company has placed a heavy emphasis on new product development for end users to offset lost IBM revenue. "The first quarter of our fiscal year just ended in August, and we had essentially no IBM revenue," Seidler said. "We're happy to say we were in the black. Many thought we'd be heavily in the red, since many vendors get on that IBM roller coaster."

Sytek is looking to increase its installations by expanding its personal computer network products, said Brad Baldwin, an industry analyst with Dataquest, Inc., a market research firm in San Jose, Calif. "Sytek's bread and butter has been in the terminal network market," Baldwin said. "These announcements are significant because they show network boundary lines are beginning to erode."

Interconnectivity is a major issue facing users, concurred Jack Thomas, telecommunications planning and operations manager for Tektronix, Inc. "We serve so many kinds of users, it's important to Tektronix to be able to bridge from one networking system to another." Thomas said the Beaverton, Ore.-based company has several dozen network-based personal computers as well as a large broadband network with more than 3,000 data

connections. Interconnectivity drove the decision to adopt Novell's Netware network operating system. Sytek de-

to offer the Netware operating system because it has been gated to other networks and has a large base of available application software, Seidler said. Users can interconnect a System 6000

another vendor's network putting netinterface cards from both

using Netware to communicate across them, Seidler said. Netware/ 6000 is priced at \$2,045 per server, including the network interface card.

The network servers to be announced today are available with either 75M bytes or 150M bytes of storage and come in tabletop, rack-

> mounted models. floor Prices for the 75M-byte sion, the 6611,

companies into one file server and start at \$9,995, and prices for the 150M-byte version, the 6621, start at \$13,995. The 6611 is both a file and print server and includes a

floppy disk drive, a keyboard and display. Another new server, the 6620, is a 150M-byte server and starts at \$13,300.

The 6430 SNA Gateway, priced at \$3,950 per server, consists of a file server interface card and software. The 6430 can emulate an IBM 3274 cluster controller and supports up to 32 simultaneous host sessions. The 6420 Internetwork Bridge allows personal computer users to access a host computer, micro or any other device on Sytek's System 2000 asynchronous network and System 3000 IBM 3270 networks. Priced at \$6,560, the 6420 supports 16 simultaneous sessions and can emulate most terminal types, providing terminal access and file transfer.



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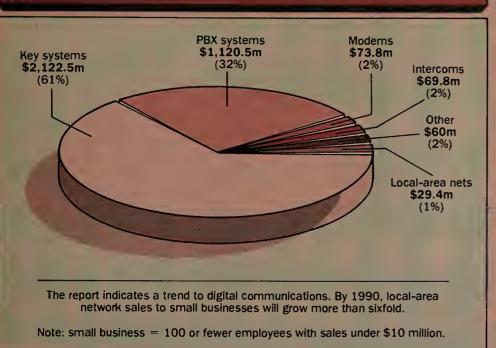


## INDUSTRY UPDATE

#### **DCA completes Cohesive merge**

Digital Communications Associates, Inc. announced last week the completion of its merger with Cohesive Network Corp. DCA issued approximately 1.65 million shares of new stock. The companies will consider joint product development to take advantage of DCA's expertise in packet switching and Cohesive's strength in circuit switching and T-1 technology. Cohesive's sales staff will be combined with DCA's.

#### Estimated communications equipment sales to small business in 1985



ANALYSIS

## 3Com thriving in LAN market

BY PAM POWERS

Senior Editor

MOUNTAIN VIEW, Calif. — 3Com Corp. is proving its resilience to the swiftly changing local-area network market. The company recently reported record first-quarter fiscal year 1986 sales of \$20 million. First-quarter revenue was up 49% over the same period last year.

3Com, a leader in personal computer work group local-area network sales, was founded in 1979 by Bob Metcalfe, one of the inventors

of the Ethernet local network at Xerox Corp. The company first manufactured and marketed a set of Ethernet transceivers, which are analog devices enabling an Ethernet controller to use a standard Ethernet line.

3Com's growth accelerated around 1981 with the introduction of an IBM PC Ethernet adaptor card. The product line then grew to encompass network software and network servers. The company now employs 400 people at head-

See **3Com** page 14

LABOR

#### CWA okays three-year Nynex pact

But Snet workers remain on strike.

BY NADINE WANDZILAK Staff Writer

NEW YORK — Except for a handful of clerical workers, members of the Communications Workers of America (CWA) recently ratified a proposed three-year contract with Nynex Corp.

Despite the ratification vote, 250 clerical workers with the Central Order Bureau of Nynex's New England Telephone went out on strike Sept. 20 because of a job and salary reclassification proposal would "limit upward mobility," according to Nynex spokeswoman Clara Allen. The clerks are involved with the publication of Nynex directories. Although informal discussions were held last week, no formal negotiation sessions were scheduled between the clerks and management. Picket lines were reportedly set up at the Lynn, Mass., Nynex office.

The remaining 37,750 CWA members at Nynex ratified the contract by a substantial margin on Sept. 19, Allen said. The CWA struck Nynex for eight days this past summer, primarily over the is-

See CWA page 14

**VENDOR VIEW** 

#### PETER THORNTON

#### X.25 isn't just packet switching

t is not widely understood, but packet switching is a technology that has very little to do with the CCITT X.25 recommendations.

SOURCE: FROST & SULLIVAN, INC., NEW YORK

Packet switching is a network technology suitable for transaction-oriented traffic on shared communications hardware. The X.25 recommendation, a de facto standard, was designed for user access to almost any kind of data network. It specifies how a connection is made, how the data flow is controlled and how the call is terminated. Some associated standards cover addresses (X.121) and the interconnection and control of Ascii terminals (X.3, X.28 and X.29).

X.25 interfaces can be found connecting many devices without packet switching. The most common is as a connection between two computers or a computer and an intelligent user terminal. The recommendation provides for multiple logical channels that make up virtual circuits between two network user programs. It is a very efficient, very standardized way of controlling the connection be-

Thornton is director of marketing at Amnet, Inc., a Framingham, Mass., company that designs, manufactures and markets X.25 wide-area private data networks. tween two computers.

Perhaps the first major vendor to use X.25 extensively was Data General Corp., whose Zodiac networking was announced with X.25 as the computer-to-computer connection mechanism. X.25 interfaces can also be

66 The X.25

 $\overline{standard}$ 

permits up to

4,095 logical

channels, or

virtual

circuits, to be

active at the

same time. ??

found on networks as diverse as slotted rings and IBM's Systems Network Architecture, providing a standardized user connection mechanism.

The X.25 standard permits up to 4,095 logical channels — so-called virtual circuits — to be simultaneously active. It very ef-

ficiently coordinates the transmission of blocks of data from one user to another or from a computer to a network node.

IBM recently announced that SNA nodes would support X.25 interfaces — in other words, users could pass data into an SNA network at a 3720/3725 port using the X.25 procedures, and it would pop out at a different node with an X.25 port.

Beyond this simple point-topoint connection, it is often necessary for several X.25 connections to be made between systems. Thus, the small X.25 switch was invented to provide a more cost-effective solution.

These simple X.25 switches are hardly packet switches in the true sense. Often, the switching involves no more than transparently passing the packets from one port to the other without any concern for other X.25 features.

Packet switching was invented in the 1960s to perform ondemand, high-speed data multiplexing and routing. Multiplexers take advantage of the fact that it is statistically unlikely that several terminals will all send lots of data at once. Just as bank designers assume not everyone will want to go to the bank at the same moment, a multiplexer works on the as-

See **X.25** page 10

#### ▶ JOB INSECURITY

## AT&T cuts management slots to pare work force

Severance plan offered as inducement.

BY PAM POWERS

Senior Editor

NEW YORK — As anticipated before its recent reorganization, AT&T is becoming increasingly aggressive about paring its work force in the face of dwindling earnings. The severance plan, announced two weeks ago, will be the next tool to measure and do away

with fat in the organization.

The corporatewide severance package is aimed at reducing the surplus of mid- and low-level managers. The Business Markets Group, recently formed under a major reorganization, will implement the plan within the coming weeks.

The program, outlined in an employee bulletin issued Sept. 18, gives senior managers the author-

ity to offer mid- and low-level managers severance pay equaling 5% of their salaries for each year of service with the company, up to 20 years.

Those offered the program may voluntarily accept. Volunteers have a choice of receipt of payment in monthly installments or in a one-time lump sum. Employees accepting the offer involuntarily are entitled to the same severance pay scale but must accept payment in a lump sum.

In the past year, AT&T has moved to trim its work force, a move that was triggered by increased competition and erratic earnings performance. Last fall, the company implemented a layoff plan resulting in the dismissal of

21,000 employees. In the current plan, the number of layoffs is unspecified.

AT&T has reported a decrease in earnings over previous quarters three separate times in the past year. Second quarter 1986 earnings, at \$461 million, were flat from the same period in 1985.

X.25 from page 9

sumption that many users can share the same piece of wire linking two points.

The routing function is the extra feature that packet switching adds to multiplexing.

A packet-switching node can take a packet of user data off the communications link and send it with other packets on another link.

Thus, a packet switch provides some intelligent routing, switching of user data packets as well as multiplexing the data on and off the various communications lines.

Most users think of X.25 as a reliable connection mechanism. It is not widely known that many packet networks can be unreliable. But the Department of Defense, aware of that fact, assumes that the network is unreliable.

A special user-to-user mechanism, Transmission Control Protocol, was developed to allow a user to verify that data packets were in the right order and none were missing, which would require retransmission.

Many users and vendors use the terms X.25 and packet switching as if they are interchangeable. In many respects, they are, or the differences don't matter.

However, there is one aspect that a user should consider when thinking about X.25-based networking.

There is a fundamental difference between a network consisting of boxes interconnected by X.25 links and a backbone packet network of three or more nodes with a special internodal trunking protocol.

The latter is usually a sophisticated facility with the multiplexing and routing described above.

A backbone network, whether packet-switched or otherwise, usually has additional attributes such as an end-to-end transport protocol. This ensures that user data doesn't get lost and creates an alternate routing mechanism to bypass line failures; the better system reroutes completely automatically, and, to the network user, invisably.

In contrast, X.25 does not have any big network features. Networks using only X.25 procedures require tables in each box to provide a map between the connections on each link and have no end-to-end data integrity.

A packet could get destroyed because a secondary link failed, and the user on the primary link would never know whether the data arrived or not.

In addition, maintenance of separate tables in each box becomes tedious as more boxes are added, unlike a backbone packet network that usually has a single data base of connections.  $\square$ 

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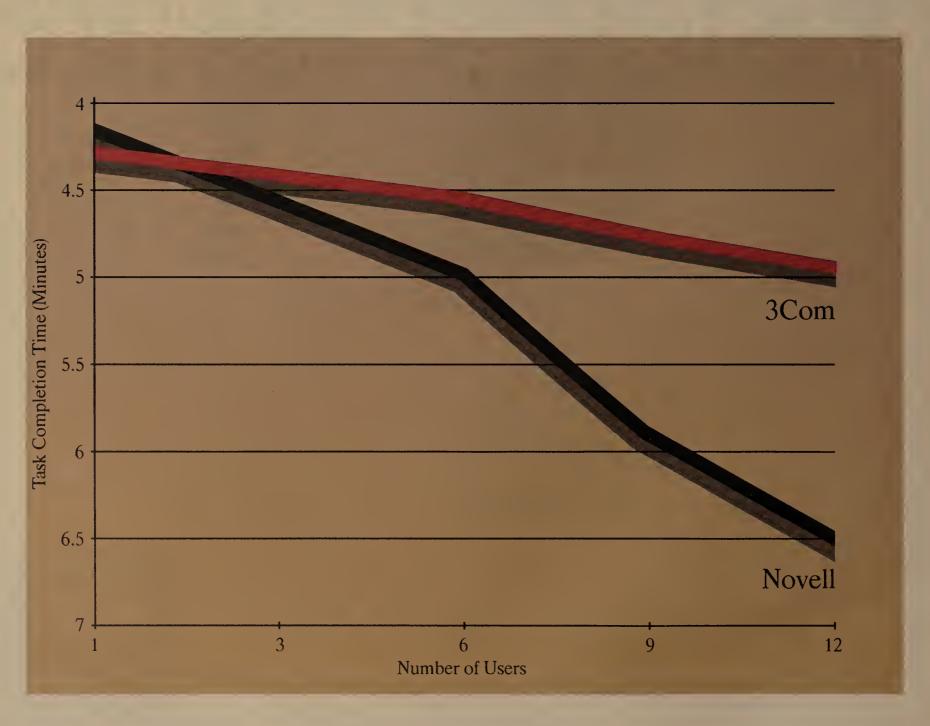
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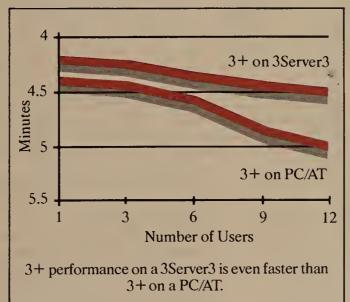
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#### 3Com from page 9

quarters here, and fiscal year 1985 sales have grown to \$64 million, up from \$1.8 million in 1982.

3Com's product line has undergone a similar growth process. Network adaptors now contribute 50% of the company's annual revenue, network servers 35% and network software 15%. The Etherlink Adaptor product line is the highest volume seller, recently growing to almost 10,000 unit sales per month.

In its five years as a prominent vendor in the local network market, 3Com has changed its marketing strategy with the shifting tides of user demand and vendor competition. Initially, products were sold through OEM agreements and some direct to the end user.

Today, about 65% of the product line is sold through distributors and international representatives. The company's director of corporate marketing, Doug Pollack, said that in focusing on building relationships with key dealers, 3Com has developed a competitive barrier to entry.

Having created its niche in PC work group networking applications, 3Com is building a fortress around its territory. In recent weeks, the company introduced the

**66** In its five years as a prominent vendor in the local network market, 3Com has changed its marketing strategy with the shifting tides of user demand and vendor competition. ">>

3Server3, a server priced to undercut the competition. Pollack said the 3Server3's \$7,000 price tag represents a hefty 30% reduction over previous offerings. In addition, 3Com has passed on savings from high-volume shipments of the Ethernet adaptor line by announcing price cuts across that line, too. Continued price erosion in the

server market, propelled by the use of cheaper Personal Computer ATs as servers, may cut into 3Com's profit margins. However, according to Harvey Freeman, vice-president of Architecture Technology Corp. in Minneapolis, "They have a lot of room to maneuver in pricing. 3Com could price still lower to compete against IBM, if they have to."

If 3Com has an Achilles' heel, it is its presence in the network software market in which Novell, Inc. reigns with its Netware operating software. Responding to Novell's challenge, 3Com recently nounced a large family of software products, the 3Plus line, and is now busy trying to catch up.

Kim Myhre, vice-president of communications programs at International Data Corp., Framingham, Mass., said he believes 3Plus is a competitive product and that 3Com's established relationships with systems manufacturers will give the company a distinct advantage over Novell. 3Com will continue to invest heavily in software development, according to Pollack.

3Com's software problems seem minute in light of its currently strong profile. But Myhre sounded a note of caution for the future. AT&T's Starlan offering may prove to be a formidable threat. "Although Starlan doesn't yet have the software, I expect to see AT&T move the product through the systems manufacturers as a low-cost local network solution," he said.

3Com voices optimism despite the potential threat: Projected sales for fiscal year end 1986 are \$100 million, which calls for an aggressive 56% growth rate.

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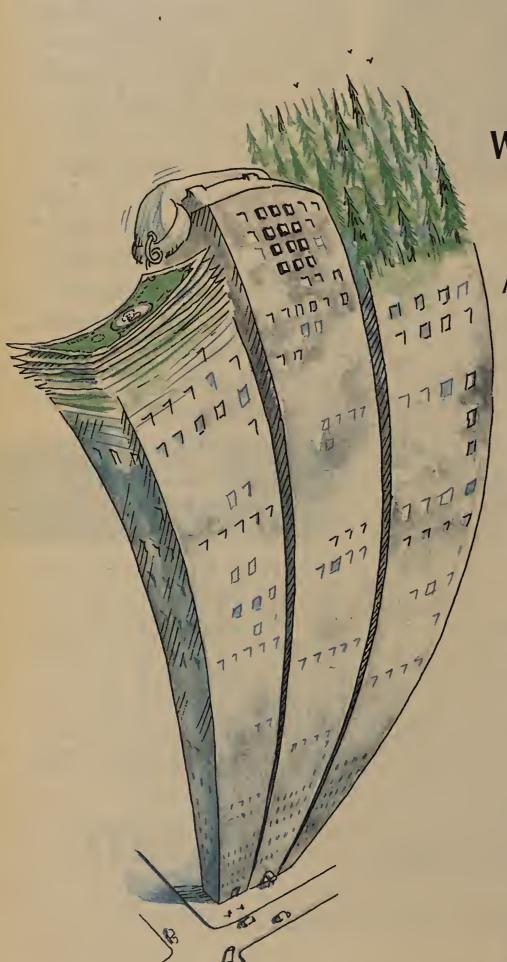


#### CWA from page 9

sues of job security and cost-of-living adjustments.

Another strike continued last week against Southern New England Telephone (Snet) by the 9,600-member Connecticut Union of Telephone Workers (CUTW). CUTW members defeated a proposed contract on Sept. 12. Snet is an independent telephone company that was partially owned by AT&T at the time of divestiture.

CUTW members object to two main contract provisions, according to CUTW spokesman Rick Melita. They oppose a lump sum payment of \$400 as part of the 21/2% wage increase in each of the next three years. Union members also balk at shouldering 20% of their annual health care premium as well as a higher deductible of \$300. Under that provision, a family could pay up to \$1,300 a year out of pocket for health care, he said. The union also objects to mandatory overtime, he said. The CUTW defeated the proposed contract by a vote of 4,610 to 3,544.**∠** 





#### **Telenet forms Contemporary arrangement**

Contemporary Group has teamed up with Telenet Communications Corp. to offer a nation-wide paging service. Contemporary will use Telenet's packet switch network to send and retrieve messages to dispersed transmitting stations. Services will include Tone-Only Paging, which alerts the user to waiting messages, and Numberic Display Paging, whith a 24-number display showing the calling party's number.

#### Terminal support: Leased vs. switched access to the public network

	1985		1990	
Terminal category	Dedicated	Switched	Dedicated	Switched
3270-type terminals Link estimates Survey averages	100%	0%	100%	0%
	100%	0%	91%	9%
2780/3780-type RJE Terminals Link estimates Survey averages	100% 100%	0% 0%	100% 94.4%	0% 5.6%
Ascii-type terminals (conversation/editing) Link estimates Survey averages	60% 50%	40% 50%	40% 34.4%	60% 65.6%
Asynchronous microcomputers Link estimates Survey averages	0%	100%	0%	100%
	1.1%	98.9%	2.2%	97.8%
Other asynchronous terminais Credit authorization Link estimates Survey averages	0%	100%	0%	100%
	6.6%	93.4%	2.2%	97.8%
Automated teiler machines Link estimates Survey averages	5%	95%	5%	95%
	15.4%	84.6%	10%	90%

SOURCE: LINK RESOURCES CORP., NEW YORK

#### CROSS TALK

**JOHN DIX** 

#### Poor timing for SDNs

The advent of virtual networks could not have come at a worse time in the evolution of telecommunications. In fact, acceptance of the new services may be stymied until the longhaul market settles down.

While virtual networks — also called software-defined networks — offer savings over some traditional networks, justifying the services on cost alone can be dangerous.

Virtual networks are achieved by creating private networks in the memory of long-haul carrier's switches, instead of using dedicating lines. Network links are established on a call-by-call basis using the carrier's switched network.

This provides economic benefits to the carrier, which can be passed on to the end user, but it comes with stiff penalties. Commitment to virtual network services requires a large capital investment in installation fees but, more importantly, eliminates customer transport options.

Once virtual networks are installed, the user is stuck with the long services of that carrier. Unlike traditional services that can be mixed and matched to achieve optimum cost advantages, virtual networks lock in users. It would be undesirable

economically, if not logistically impossible, to have a mix of virtual network services.

While a single vendor's virtual net service may be economically appealing today, it may not be as sweet tomorrow, particularly in this day and age.

With all of the tariff and industry upheaval and the deals that are being swung today, it would seem risky to commit to a service that involves high entry costs — both in terms of capital expenditures and planning and conversion time — and eliminates transport options.

These considerations would seem to be responsible for the slow acceptance of virtual networks. It is too early to tell, however, if the sluggish reaction to virtual networks is simply due to the long planning lead time needed to evaluate services or an actual indication that companies are reluctant to hand over that much control to one carrier.

Interestingly enough, of the virtual network contracts being awarded today, AT&T's competitors get a fair share. This is a strong vote of confidence for the other common carriers, and bodes well for competition and the breadth of future services and rates.

DIGITAL DATA SERVICE

## Upgrade to aid in net control

**BY JOHN DIX** 

Senior Editor

Local and long-haul telephone companies are readying a digital data service enhancement that will provide customers with network monitoring and management functions similar to those available with analog networks today.

The enhancement will add a secondary channel to traditional AT&T-like Dataphone Digital Services (DDS) as offered by the former Bell operating companies, AT&T and other interexchange carriers. Although technical specifications for DDS with secondary channel are agreed upon and have been published by Bell Communications Research, Inc. (Bellcore), no one has filed a tariff for the service.

Pacific Bell, which is apparently closer to deploying the service option than any of the other companies, expects to file a tariff and offer DDS with secondary channel by the end of the year, according to the company's DDS product manager, Mike Trombetta.

AT&T, which was once the sole provider of DDS services, is interested in offering the DDS enhancement but has its hands tied by the local telephone companies, a spokesman said. It is futile for AT&T to support the option until the local companies can extend it to the end user.

Once available, DDS with secondary channel will provide customers with many of the network management functions to which they have become accustomed with analog modem-based network management systems.

Unlike analog facilities, however, DDS is provided with a guarantee of transmission quality and reliability, meaning the network management features made possible with secondary channel will be devoted to monitoring network components, not line conditions.

It will make it possible, for example, to monitor network use and gauge things such as response time, Trombetta said. This would be useful when trying to judge the effect that host software changes have on network traffic.

Lack of network management has, Trombetta believes, discouraged some users from migrating from analog facilities to digital services for data transport. DDS services are inherently more reliable and error-free.

Paul Baxter, product manager of Racal-Milgo, Inc.'s digital access products, agrees. "Customers need mixed medium networks with some digital and some analog facilities. They have had net management control in analog nets but have been prevented from passing control channels with DDS."

Like analog modem-based network management systems, DDS with secondary channel will integrate diagnostic data with the main data-bearing channel on the same wire. The difference is, however, that analog systems carry diagnostic data on a second channel operating at a frequency lower than the data-bearing channel, whereas DDS provides the second channel by appropriating bits from a continuous data stream to diagnostics.

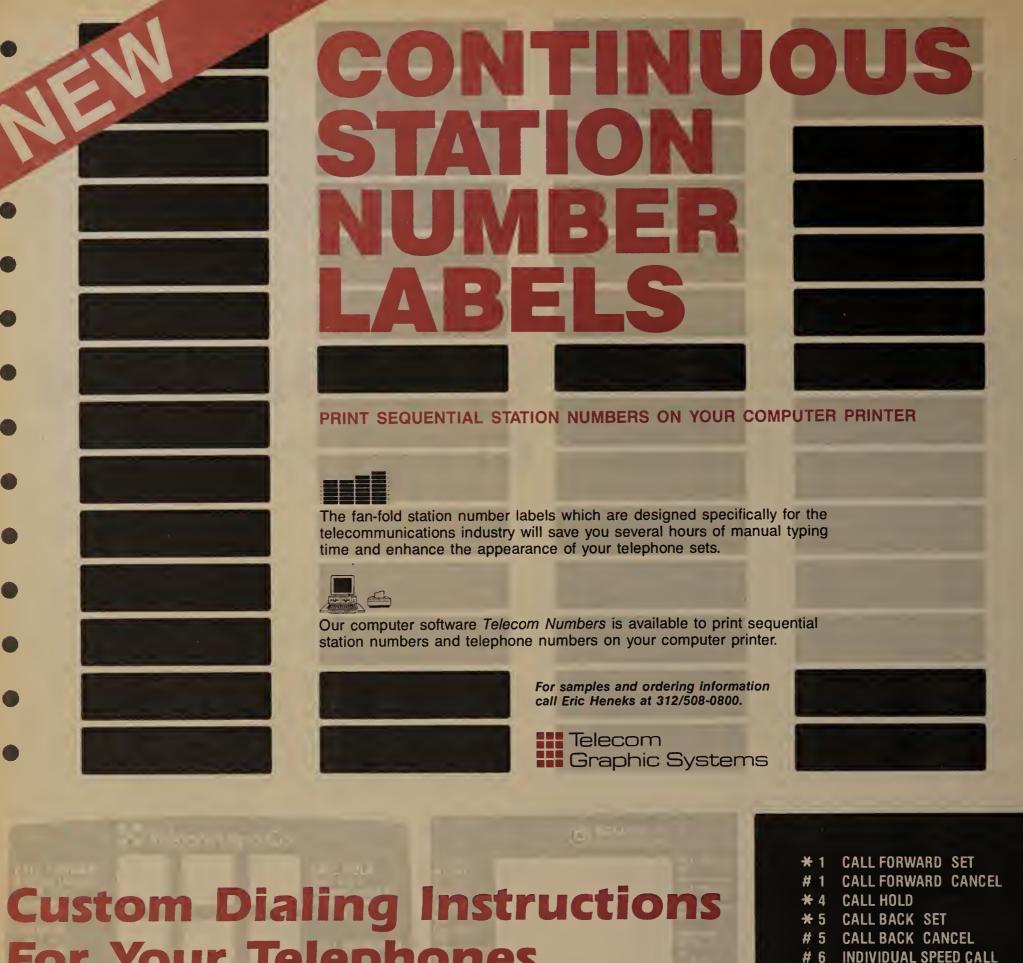
Racal-Milgo and AT&T Information Systems are two of the first companies to announce Digital Service Units (DSU) capable of supporting a DDS secondary channel.

According to Trombetta, secondary channel support is made possible by moving the framing and control bit insertion responsibility out to the DSU at the customers' premises. "We then have the ability to time-share the control bit with the customer, essentially letting the customer use every 24th bit in the bit sequence," Trombetta explained.

The secondary channel typically operates at one-quarter of the DDS rate, according to Baxter. When calculated for typical DDS rates, the secondary channel operates at 133 bit/sec for 2400 bit/sec service, 233 bit/sec for 4.8K bit/sec links, 533 bit/sec for 9.6K bit/sec service and 2600 bit/sec for 56K bit/sec service.

One of the key benefits of secondary channel support with DDS will be the ability to recognize and isolate remote failures, particularly in multidrop environments.

A streaming device in a multidrop environment will seize an entire line. (Multidrop configurations in the digital realm are achieved by gathering point-to-point lines at a hub or bridge site.) "Diagnostic DSUs can automatically disable a streaming device and notify the central site," Baxter said. 2

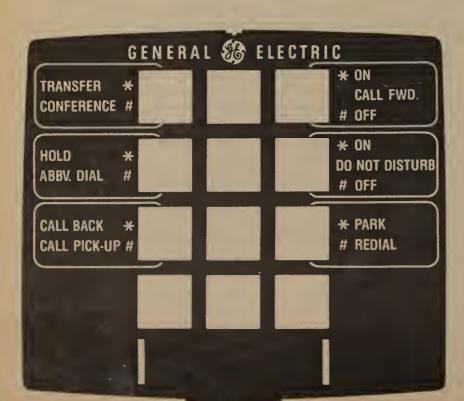


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## FACTORY COMMUNICATIONS

#### **IBM** and factory nets

IBM's role in factory networking is the subject of a recent International Data Corp. study. Anyone interested in the report, "IBM in the Factory: Piecing Together a Strategy for CIM," should contact the Framingham, Mass.-based market research and consulting firm at 5 Speen St. in Framingham, Mass.

USER SURVEY

#### Migration to MAP worries users

CIMdata study says 45% of users eye net upgrades.

#### BY BOB WALLACE

Senior Writer

ANN ARBOR, Mich. — Roughly 45% of the companies in the MAP/TOP Users Group say that integrating present networks with evolving standards is one of their primary concerns, according to a recent survey.

The survey of the users group, conducted by CIMdata, Inc. and presented to the group at its last meeting, raised many issues surrounding Manufacturing Automation Protocol/Technical and Office Protocol, some of which were addressed at the same meeting. The group labored to address, for example, the migration path from proprietary networks to MAP/TOP standards.

A solution offered by one user speaking at the group is to employ the U.S. Department of Defense's Transmission Control Protocol/Internet Protocol (TCP/IP) in the interim, while awaiting the maturation of MAP technology.

Dwight Cass, of Northrop Co.'s automation sciences laboratory, told the users group that the aerospace corporation took a hard look at both MAP and TOP technologies but decided neither one would meet the company's immediate communications needs.

"The main problem we faced was that we just do not have MAP for all of our [mainframes]," he said.

"We are committed to having a communications system in place in the 1988-to-1989 time-frame that is consistent with the goals of the MAP/TOP [specifications]."

Cass explained that TCP/IP was chosen as the network migration tool for a number of reasons. "TCP/IP is available for all of our [mainframes], and TCP/IP nets can be bridged to data networking environments such as SNA and Wangnet," he said. "We want to begin developing applications for future MAP/TOP nets now and ensure the code we use today does not have to be redone later."

#### Conformance testing

The MAP/TOP Users Group worked to address their members' confusion about the testing and certification of purported MAP- and TOP-compatible network hardware and soft-ware

The group was addressed by members of Industrial Technology Institute (ITI), a nonprofit organization based here, which tests products to determine if they conform to the MAP specification.

The emphasis on product testing was necessary in view of the results of the CIMdata study, which showed that 37% of the 237 users group members surveyed claimed that certification of MAP products was one of their chief MAP

Major concerns about using MAP or TOP networks

	Respo	Respondents	
	MAP	TOP	
Upgrading or retrofitting existing networks	45%	48%	
Certification of products	37%	30%	
Other networks will still be required	33%	27%	
Training and maintenance requirements	32%	20%	
May not become a significant standard	27%	46%	
System security issues	14%	14%	
Too slow	13%	4%	
lard to use	11%	_	
Other networks will be better	8%	16%	
nappropriate in my type of operation	8%		
Other	27%	otstror in serie	

networking concerns.

Several speakers described in detail the testing work undertaken at lTl and the National Bureau of Standards as well as future MAP product testing to be performed by the Corporation for Open Systems (COS). COS is expected to begin testing products to see if they conform to the

yet-to-be-announced MAP Version 3.0.

In an action expected to speed MAP product development, ITI announced it is working on software that could be used to help vendors determine if their products conform to the specification. The software, which will run on a Sun Microsystems, Inc. workstation, will eliminate pre-ITI testing confusion about compatibility. Concord Communications, Inc., formerly Concord Data Systems, Inc., will beta-test the conformance-test software.

Other concerns aired at the meeting included the issue of interconnecting proprietary networks with broadband MAP backbone networks. Of the respondents, 33% claimed they will still need non-MAP networks in their manufacturing plants.

The maturation of carrier-band nets should lessen factory networkers' dependency on proprietary local nets to support niche communications applications. Carrier-band nets are subnetworks that operate at lower speeds than backbone nets and better serve the communications needs of

individual manufacturing cells.

Despite the rapid expansion of the factorynetworking education market, 32% of the CIMdata survey repondents claimed that training and maintenance requirements for their companies' factory and management staffs represent a major concern.  $\square$ 

#### **FACTORY FACTS**

**BOB WALLACE** 

#### Fixing fiber's role in MAP nets

n the wake of the announcement of AT&T's plans to explore the possibility of running the Manufacturing Automation Protocol over fiber-optic cable, it's time to take a look at the advantages and disadvantages of light-wave media for advanced factory floor networks.

The General Motors Corp.championed MAP specification currently mandates the use of coaxial cable for broadband, token-passing bus, local-area networks. The MAP/TOP Users Group announced the creation of a fiber specification special interest group charged with recommending and developing fiber-optic standards that might one day be added to the MAP specification. Do not, however, expect to see fiber-optic cable added to the MAP specification as an

alternative transmission medium in the next year.

The AT&T-Concord Communications, Inc. MAP fiber project was received with keen interest by many users attending the factory networking powwow. One user, Litton Industrial Automation Systems, plans to give fiber-optic cable serious consideration for use on the factory floor of the company's Waynesboro, Pa., plant. It's well-known that the Japanese favor, and have already installed, fiber-optic cable-based networks on the floors of their manufacturing facilities.

Fiber-optic cable has been given a somewhat undeserved bad rap in the general communications industry. Fiber is expensive; it is difficult to split; there aren't enough fiber-optic network components to attach to it;

and it is difficult to connect two pieces together.

Those were, and to some extent still are, the complaints of communications users.

Although all of these problems have been lessened or eliminated, the same old criticisms are now being rehashed in the factory communications world.

Glenn Yeager, a consultant with the Ypsilanti, Mich.-based Integrated Automation Corp., said fiber will not be widely used as part of factory floor networks for at least two to four years. He said creating a two-way communications network on fiber is more difficult than creating a similar system on coaxial cable.

The proliferation of what Yeager referred to as "active" fiber-optic taps will

See **Fiber** page 53

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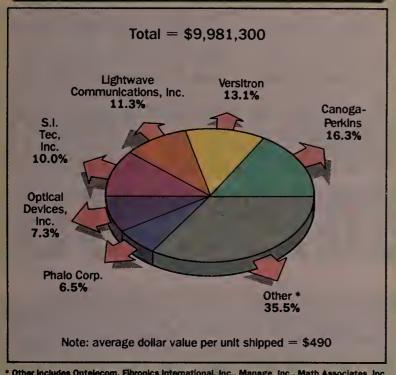
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66 Most people are underestimating the network management task. We've spent close to 15 years working on Systems Network Architecture. At least that much time will be needed before SNA is capable of managing all the components that a company might have on its network.

John King Independent consultant Carmel, Calif.

#### 1985 market share of fiber-optic modems



Other Includes Optelecom, Fibronics International, Inc., Manage, Inc., Math Associates, Inc., Honeywell, Inc. and Artel Communications Corp.

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS

TECHNOLOGY

## Visionary modem ups productivity

Houston bank, California manufacturer use innovative tool to share data, keep in touch.

**BY JIM BROWN** 

**New Products Editor** 

Productivity at two companies' remote offices is being boosted with the help of a modem that features a 48K-byte random-access memory (RAM) buffer.

The modem is helping a Texas bank keep in touch with remote locations across the state. The device is also helping a California-based manufacturer supply its nationwide sales staff with daily information.

The Visionary 1200XT, developed by San Francisco-based Visionary Electronics,

Inc. (VEI), features an internal Intel Corp. 8085 microprocessor, 16K bytes of programmable read-only memory, internal communications software and a 48K-byte buffer.

The device, which is essentially a small computer and modem rolled into one box, more closely resembles a clock radio than a piece of data communications gear.

The first Visionary unit, a 300 bit/sec device with 48K bytes of memory, hit the market in 1982, according to VEI President Brad McMillan. A 1,200 bit/sec model was

See Visionary page 20

ANALOG MODEMS

#### **Fading into the sunset**

BY PAUL KORZENIOWSKI

Senior Editor

FRAMINGHAM, Mass. — The analog modem market may be fading, but its demise will be slow, not fast

That finding was reported in "Evolution in Modem Technology," published by International Data Corp. (IDC), a market research firm here

The report listed three reasons why analog modems will only slowly fade into the sunset. First, the installed base of analog lines represents a tremendous investment that could only be replaced by an equally large expenditure in other types of transmission facilities, such as fiber. Second, analog modems support better network management tools than both digital and fiber-optic devices. Third, digital technology does not offer the asynchronous support needed by most microcomputer users.

The report also found that terminal and microcomputer users are migrating from low-speed transmission, such as 300 bit/sec, to high-speed transmission, such as 2,400 bit/sec, for dial-up connections. IDC predicted that, consequently, the market for 2,400 bit/sec, full-duplex modems will grow by approximately 40% through 1990. Along with the 4.8K bit/sec level, the two segments represent

the fastest growing segments of the modem market.

The report added that actual revenues for some of the lower speed modems, those under 2,400 bit/sec, will drop in the next five years. Increased competition will force vendors to slash prices in order to keep or increase market share.

A hot market exists for digital modems, and IDC expects it to experience 31.1% compounded growth during the next five years. The digital modem market segment will expand from \$29.7 million in 1984 revenue to \$642 million in 1990.

These modems connect customer premises equipment to services such as AT&T's Dataphone Digital Service. The migration from analog devices and an increase in the number of digital circuits will spur the rapid growth.

Short-haul modem shipments will grow moderately, 8.7% per year, but price erosion will cause revenues to increase at a rate of only 4.8%.

Revenue from sales of fiber-optic modems increased by a healthy rate of more than 80% in 1984. Revenue should grow from \$5.8 million in 1984 to \$40.3 million at the end of the decade.

The report is available for \$1,500 from Dorothy Ferriter at IDC, (617) 872-8200. ☑

#### DATA DIALOGUE

PAUL KORZENIOWSKI

#### Peering into peerto-peer communications

ey, what are you guys talking about anyway?
Whenever I talk with one of my fellow writers, peer-to-peer communications takes place.
Sounds simple, right?

Things get infinitely more complicated in the world of communications. So, users should take a very close look at products that tout this capability. To supply true peer-to-peer capabilities, two components are needed.

First, network protocols have to support this type of communications. IBM's LU 6.2 is the most noteworthy example of the first component. Second, the devices have to be smart enough to establish and maintain a peer-to-peer connection.

Many products can support peer-to-peer protocols. However, this type of link is typically made between an intelligent processor, such as a minicomputer and a dumb device — for example, a terminal. The dumb device is usually unable to support a true peer-to-peer connection. So, all the user really ends up with is a master/slave connection disguised as a peer-to-

peer connection.

In IBM parlance, dumb devices are designated as Physical Unit 2.0 devices. True peer-topeer capabilities are only present in PU 2.1 devices. Few current implementations of LU 6.2 support PU 2.1 devices, so don't waste your company's money on them.

Getting ready to go? Network Equipment Technologies Co. (NET), the high-flying startup T-1 manufacturer in Redwood City, Calif., may be readying itself for a public offering.

Gartner Group, a market research firm based in Stamford, Conn., expects NET to increase its sales from \$4 million last year to \$25 million by the end of 1986. That healthy increase would seem to be enough to guarantee a favorable public offering.

Some analysts expect the offering to come at the beginning of next year. This prediction was buttressed by the company's recent decision to bring in Barrett B. Roach as vice-presi-

See **NET** page 21

#### **IBM INSIGHTS**

Filling in another hole. Included in IBM's Netview announcement earlier this month was Token-Ring Network support for another member of the Personal Computer family. 1BM 3270 Personal Computer users with Version 3 of the 3270 Personal Computer Control Program can now attach the microcomputer to a Token-Ring Network through an IBM Token-Ring Network Personal Computer Adapter or Personal Computer Adapter II. The 3270 Personal Computer, which can support up to seven sessions, has to be used with the latest release of IBM's Network Basic I/O System (Netbios), Version 1.1. An upgrade for 3270 Personal Computer users will be available for \$35 in January.

Looking for a cheaper route. IBM also unveiled a Token-Ring Network starter kit that ties as many as four Personal Computers to the network. The kit, which includes an access unit, adapters, cables and network software, enables a company to pilot test the network. Many large companies already run a Systems Network Architecture network and have enough money to test the Token-Ring Network in one or more departments. The starter kit is geared to small and medium businesses that may be unwilling to spend more than a few thousand dollars to test the network. The kit, which is currently available, sells for \$4,574. Other local network vendors also sell starter kits.

Kudos to Big Blue exec. Recent IBM announcements have supplied an overall architecture, rather than a piecemeal approach, which IBM and other vendors had been using to solve users' problems. Announcements, such as those regarding the Netview enhancements, have been very impressive.

Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. consulting firm, credited Stephen Schwartz, former president of IBM's Communications Products Division, with the shift. Even though Schwartz was transferred to the company's System Products Division earlier this year, Dzubeck said that the groundwork for the announcements was laid during Schwartz' tenure. That groundwork appears to be very solid.

Tying a little piece into the bigger picture. Products that link the 1BM RT Personal Computer with Systems Network Architecture networks were also part of the IBM announcements. The RT Personal Computer Workstation Host Interface Program features 3270 terminal emulation, file transfer capabiland an application programming interface. Other products supply an RT with Binary Synchronous Communications and Synchronous Data Link Control protocol support. The programs range in price from \$995 to \$1,195 and will be available next March. Visionary from page 19

introduced later.

Features of both models include half- or full-duplex operation, a message waiting signal, serial printer port, programmable autodial and autoanswer and a 30-day battery backup.

The modems are compatible with AT&T 212A and 103 and the CCITT's V.21 and V.22 standards. The company said 800 units have been sold.

Houston-based First City Bancorp has purchased 77 modems from Visionary. First City Bancorp uses the product's ability to receive and store messages and then alert personal computer users that a message is waiting, according to the bank's director of corporate

communications, John Reese.

"The reason the buffer is important to us is that personal computers are used for many other things such as spreadsheets, data base files and loan application processing," Reese said. "We didn't want to have people stop what they were doing to receive messages."

First City Bancorp's 64 remote sites across the sprawling Texas landscape communicate regionally and with the Houston headquarters. The modem is used with Western Union Telegraph Co.'s Easylink electronic mail service to distribute administrative documents.

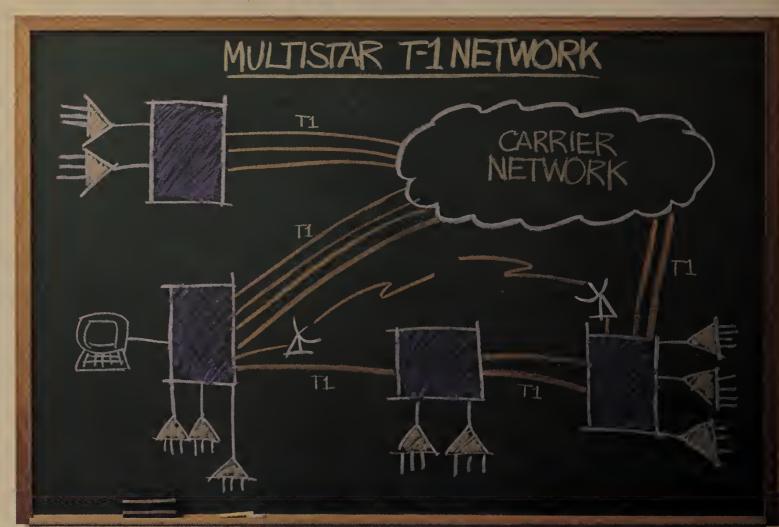
The connection keeps member banks apprised of stolen check numbers, bank fraud and other possible financial scams to be watched.

The link is also used to keep member banks informed of daily changes in interest rates for certificates of deposit, mortgages and other bank financial services.

Installed in November 1985, the modems are hooked to IBM Personal Computer XT and AT models and Compaq Computer Corp. personal computers at each member bank, and in several departments at the main office, all of which use Easylink's Instant Mail Manager software. "We transmit the message one time," Reese noted. Easylink's automatic delivery dials the phone numbers, makes the interconnection, verifies the answer back and sends the message.

Once a message is received and accepted by the modem, a message

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waiting tone that resembles a ringing telephone is sounded and a light appears on the modem front. Users can disable the tone, but the light remains active until the message is off-loaded from the modem memory to a local floppy disk.

Currently, each remote site follows bankwide guidelines for using the modem. "Every personal computer is configured exactly the same. They have the same mailing lists and the same options to go from machine to machine and location to location," Reese said. But, he added, "there are some interesting features that we're letting our users evaluate now."

One of those features is the recently released remote access function, which allows users to call the 1200XT from remote sites and retrieve any messages it may be holding. Remote access will also support password protection. Other users are starting to investigate using the modem to access outside data bases automatically at specified times.

While the modem itself can be programmed to distribute messages from a user-defined mailing list, McMillan says it enhances the services such as Easylink and has replaced some Telex offerings.

While First City Bancorp uses the 1200XT to receive messages, Diasonics Corp., the San Franciscobased medical imaging equipment maker, uses its autologon and autodial features to search for and retrieve messages stored in MCI Communications Corp.'s MCI Mail.

Once a day, each person on Diasonics' 20-member sales staff, which is located across the country, dials into MCI Mail to download messages and file daily reports and requests for backup material from headquarters. The main office calls in once a day to retrieve the reports and information requests.

"There is a lot more capability in the modem than we are using right now," said Glen Miller, director of sales operations at Diasonics. One of those unused features is the 48K buffer. "With 20 people on the road and the length of each report, our buffer would overflow very, very rapidly." He added that using MCI Mail instead of direct links is a little less expensive than long-dis-

tance phone bills.

Miller said, however, the firm expects to use more of the 1200XT's features when each remote site is hooked to a Digital Equipment Corp. VAX minicomputer in San Francisco. In that configuration, the modems will be programmed to call into the VAX at specified times, mostly at night, and download files into the buffer until the next work day. This will save administrative time currently spent manually preparing the file for transmission to MCI Mail.

The 1200XT is not alone in the buffered modem marketplace. It competes with offerings from Prometheus Products, Inc. and personal computer expansion board versions from a few other vendors.

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NET from page 19

dent and chief financial officer. The most recent financial officer moved to become the company's director of development.

An NET spokesman denied that the company had made a firm decision to go public or that Roach was brought in to speed that process. The spokesman said the company was exploring a variety of possible directions.

NET has been closely linked with IBM. A number of analysts have predicted that IBM would invest in or buy out NET before a public offering. However, that scenario does not currently appear likely.

High-speed success. High-speed modems appear to be selling like hotcakes. Digital Communications Associates, Inc. claims that sales of its Fastlink modem are going very well.

Similar claims have been made by Concord Data Systems, Inc. and Codex Corp. Sales are going so well that some users are having trouble getting evaluation models. These potential users want to test the products and see just how fast their throughput really is.

Codex's product is doing so well that the company has already sold all the modems from this year's production runs. Codex distributors have reportedly been told that they will have to wait until the beginning of next year before their orders will be filled. That situation has made them more than a little bit unhappy.

Truth is stranger than fiction.

A well-known local-area network firm sent out biographies on its key personnel. One qualification of the company's director of customer service was that the employee had directed a suicide-prevention center for more than 10 years.

To an extent, I can understand the company's rationale. When a local-area network goes down, users often become irate and irrational. However, I am not sure the person has the right qualifications.

Typically, these users want to kill the vendor, not themselves. Experience as a bodyguard might be more appropriate. In fact, Mr. T may be able to find work once *The A-Team* is canceled.  $\square$ 

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## COMMUNICATIONS MANAGER

#### **DP** bonuses to slide

Bonuses for data processing professionals are expected to drop by 20% — to an average 10.3% of base salary down from an average of 13% of base salary a year ago. The decline is attributed to uncertainty about year-end financial results in companies throughout the economy, according to a study conducted by Edward Perlin Associates, Inc., a New York-based market research firm.

INTERVIEW

## Management pro speaks out

Nancy Needham seeks a balance.

The challenges of combining communications technology, policy and business management are what attracted Nancy Needham to telecommunications. As the newly appointed associate director of New York State's Center for Advanced Technology in Telecommunications at Polytechnic University and the academic director for the center's Telecommunications Management Program, Needham advises and teaches communications managers how to balance complex technical issues with the concerns of business management - including integrating telecommunications costs into overall corporate business strategy.

Network World Staff Writer Nadine Wandzilak interviewed Needham, who divides her time teaching at Polytechnic University and

consulting at the Boston-based Institute for Corporate and Government Strategy — a nationwide consulting firm she founded.

Can good managers manage anything?

The philosophy used to be that good managers could manage anything, but the pendulum seems to be swinging back. Managers must understand something about what they are managing. If they're going to be managing something technologically complex, they'd better understand the equipment and the technical trade-offs.

Are corporations and telecommunications managers shifting their focus from technology to management?

Corporate executives are beginning

to recognize that telecommunications is an intrinsic part of their business, and they want to handle it well. Telecommunications managers have been technically oriented. Now they are paying more attention to the financial implications of telecommunications, putting communications into the overall context of a financial strategy for the firm.

More options in long-distance service, for example, and networks with corporate private and public offerings.

How were you introduced to communications?

The consulting firm where I worked had a big chunk of the See **Talking** page 24



**GUIDELINES** 

**ERIC SCHMALL** 

#### When low tech beats network pizzazz

n a crowded meeting room, a group of data processing and communications types huddles over a new business' need.

This company is about to enter a joint venture with a cross-town firm. Once a day, massive amounts of financial data will be

transferred from its host to the outside company in order to feed that firm's business cycle.

The group begins to struggle with the familiar questions of data transfer. What existing transmission facilities

can be used? What components are compatible? If new facilities are needed, do they consider bypass? What financial alternatives must come into play? How

Schmall is network systems manager for an insurance holding company.

quickly can the options be assembled, arrayed, recommended and ordered?

Suddenly, someone in the room jokingly suggests that it would be a lot simpler just to toss the assembled data into the back of a taxi once a day and

don't normally think of taxis in terms of bandwidth. Even so, such a transport method has its place under the right circumstances

If it takes an hour to have a courier deliver some media, such as tapes containing 100 million

bits of information, the resultant "rate" of data transfer averages out to 28K bit/sec.

This is quite a snappy speed, considering it didn't take weeks of analysis and not even a dime's worth of capital-

ization costs.

Someone once made the astute observation that, "If all you have is a hammer, everything looks like a nail." All too often, information transfer is thought of in terms of electrical signals flowing through wires, modems,

See Low-tech page 24

#### **ASSOCIATIONS**

IBM's role in the computer industry will be the subject of a seminar hosted by the Center for Telecommunications and Information Studies at 6 p.m., Oct. 9, at the Faculty House, Columbia University in New York.

Richard Thomas DeLamarter, author of *Big Blue: IBM's Use and Abuse of Power*, will speak on "Price discrimination in the computer industry: IBM's past and future market power."

For more information, contact the Columbia University's Graduate School of Business, (212) 280-4222.

The Data Processing Management Association will hold its 35th International Computer Conference and Business Exposition, Oct. 27 to 29 at the Georgia World Congress Center in Atlanta.

Edmund Fitzgerald, chairman of Northern Telecom Ltd., will be the featured speaker at the 1986 National Communications Forum, Sept. 29 to Oct. 1 at the Sheraton International O'Hare in Chicago. The forum is a continuing education program of the National Engineering Consortium. For more information, call (312) 828-0008.

\*\*Comeone jokingly suggests that it would be a lot simpler just to toss the assembled data into the back of a taxi once a day. \*\*?

have it delivered. After the initial chuckling subsides, the idea begins to take on an appearance of genuine credibility. A courier delivery of the output tapes would not only be the least expensive method but also could

be implemented immediately.
Communications planners

Talking from page 23

AT&T antitrust case. They wanted me to work on telecommunications, a subject I knew nothing about. The AT&T case was interesting because the entire evolution of an industry was being carved up by one judge in Washington, D.C. You could argue whether that was correct or not.

After deregulation, businesses like MCI [Communications Corp.] took advantage of regulatory openings to make what turned out to be pretty important business-strategy decisions.

There's a lot of emotion in this business. It's not just the technology. It's people and their careers and their lives and their ways of doing business.

You'll be glad you did. General

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TECHNOLOGYING

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Do you think the Justice Department or the Federal Communications Commission should oversee the former regional Bell operating companies?

I am more in favor of FCC regulation. The FCC has been regulating all types of media since 1935 and sees communications in a broader context.

The court started with an antitrust premise that is a different mind-set.

What concern do you hear most often from your clients?

With our clients — which are mostly large companies — there is a continuing theme of minimizing costs, but we see more interest in competitive analysis.

Station Balun Assemblys shown, other

styles and balun pig tails available from

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#### DIALOGUE

Should the local exchange carriers be deregulated?

66 On one hand, it could provide more competition and lower prices; but without regulation, the companies could get together and fix prices anyway. I don't really think it would be a good idea. I think it would cause a lot of confusion.

Walter Jensen
Manager of computer operations
Unisource Software Corp.
San Francisco

66 I don't think it would be a good idea at all. We had enough confusion when the long-distance carriers were deregulated. It's one thing to deregulate the interstate carriers, but it would be really confusing to deregulate the people who bring the wires into our homes and buildings.

**Pat Dennis** 

Communications specialist On-Line Business Systems; Inc. Santa Clara, Calif.

66 Deregulation would be helpful to me. I'm in a strong Illinois Bell area, with heavy intra-Lata calling. By March 1, 1987, Bell plans to go to measured service, and costs will

One alternative [to Illinois Bell] is bypass, but not for a company this size, with 100 lines.

If local exchange services were deregulated, I don't think as many players would jump into local deregulation as jumped in after national deregulation. You'd get more niche services, at a lower cost. I'd mix and choose local services for my traffic.

Bruce Such

Telecommunications manager Hollister Corp. Libertyville, III. Low-tech from page 23

multiplexers and concentrators.

It is difficult to break out of this frame of reference since most communications professionals sit near the spillways of new and rapid technology change.

In this age, the number of technical solutions vastly outnumber the

problems.

The higher layers of decisionmaking management in organizations used to be effective watchdogs in keeping unnecessarily complicated, expensive communications solutions at bay.

Since that segment of the organization was insulated from the dynamics of the technological revolutions in the industry, these managers tended to think in "old-fashioned" terms.

To them, a common carrier was something that had wheels or wings instead of fiber optics and satellites. Added to that lack of knowledge was a natural cautiousness over new, unknown forays into information transfer methods.

Chief executive officers now talk freely about "leveraging technology" and say they want to start wielding communications as a "strategic weapon."

In addition to being an advocate of technical innovation, the communications manager must now also take responsibility to restrain change.

This means he occasionally must recommend inelegant answers to communications needs — for example, the mail pouch may be superior to installing electronic mail; or walking the diskette across the room may be better than installing a local-area network.

These proposals appear anemic next to the high-tech razzle-dazzle that the decision makers are now seeing.

Nonetheless, the communications professional has the duty to provide the most efficient means of information movement.

#### PEOPLE

Dan Sparacino recently joined the City of Albuquerque, New Mexico, as telephone manager. He is responsible for voice and data communications functions and approximately 90 different communications systems including almost 20 private branch exchanges.

Sparacino was most recently communications and facility manager of the First National Bank in Albuquerque.

Dean Popps was appointed president of the Dallas/Fort Worth Teleport, a domestic and international telecommunications facility for video, voice and data transmission and reception. Popps was most recently chief operating officer and in-house counsel for the CTM Washington Teleport of McLean, Va

He also headed the ownership transition team after CTM sold its interests in its teleport to Carley Teleport Communications, Inc. in Billy Lanier was named manager of engineering and production for Comsearch Applied Technology, Inc. Lanier will be responsible for organizing a design and production operation. CAT is a subsidiary of Comsearch, Inc. and offers radio-frequency engineering services.

Robert Semple was named comptroller of Argo Communications Corp. Semple joined Argo, a long-distance telecommunications carrier, in 1984 as manager of revenue accounting.

David Thomas was appointed president of Northern Telecom Japan, Inc., succeeding Hugh Hamilton, the newly appointed president of Northern Telecom Pacific. Both offices are headquartered in Tokyo. Thomas is responsible for the overall direction and management of the company's business activities in Japan. He joined Northern Telecom Japan in 1982 as executive vice-president.



## NEW PRODUCTS AND SERVICES

See inside for:

- ▶Network monitoring package
- ▶PBX capacity doubled
- ► Voice messaging system

DATAPHONE DIGITAL SERVICE

#### **DDS** monitor unveiled

Racal-Milgo unit uses secondary control channel.

SAN DIEGO — Racal-Milgo, Inc. introduced a device at the Tele-Communications Association show here last week that will enable customers to monitor and manage Dataphone Digital Service (DDS) networks.

The CMS DSU 1500 is a digital service unit intended for use with DDS networks that support a second channel for network management and control. Although not yet commercially available, many telephone companies, including AT&T and Pacific Bell (a Pacific Telesis Group operating company), have expressed an interest in offering secondary channel DDS.

To provide a secondary channel, the overall capacity of a DDS-like link has to be increased. For example, a DDS operating at 9.6K would need to provide a 12.8K bit/sec overall capacity, said Paul Baxter, Racal-Milgo's product manager of digital access products. The CMS DSU 1500 uses about one third of the extra 3.2K bits to perform line diagnostics and monitoring while the rest of the extra capacity is used for secondary channel protocol framing, Baxter said.

Customers have not integrated DDS into their networks due, in part, to the somewhat high cost of



the service and lack of network management and control features, Baxter claimed. "The phone companies finally responded to the market pressure and are enhancing the DDS network to enable it to provide a secondary channel capability," Baxter added.

Using a Racal-Milgo proprietary T-7 secondary channel protocol, the diagnostic data service unit monitors the operation of Dataphone Digital-type service. The CMS DSU 1500 operates at 2,400 bit/sec, 4.8K bit/sec or 9.6K bit/sec and performs local and remote loop-back tests as well as end-to-end bit error tests. The unit also has self-testing capability and will trigger alarm conditions when operating parameters have been exceeded.

The unit can be incorporated into Racal-Milgo's Communications

Management Series (CMS) network monitor and control system or can be used as a stand-alone. The firm's CMS monitors between 16 and 256 channels in networks using both analog and digital services. Used in the CMS system, the device's configuration can be down-line loaded from a central site, and all test results are reported back to the central site.

In stand-alone operation, the microprocessor-based CMS DSU 1500 can be configured from a touch-sensitive key pad on the front panel. Configuration is entered from menu-driven prompts shown in an LCD. Cursors support paging between messages while commands are entered from accept or exit keys.

The CMS DSU 1500 is priced at \$1,495. Racal-Milgo, Inc. is located in Sunrise, Fla. \(\mathbb{Z}\)

DATA SWITCHES

#### Gandalf desktop unit debuts

Firm shows smaller PACX 2000 version.

WHEELING, Ill. — Gandalf Data, Inc. recently unveiled the PACX 200, a desktop version of its PACX 2000 data switcher. The firm also introduced the RM 3120A rack-mounted asynchronous modem.

The star-configured PACX 200 digital switch reportedly provides up to 128 subscribers with the ability to switch terminals and personal computers between modems, multiplexers, host computer ports and printers.

Up to 32 PACX 200 devices can be linked to support up to 3,500 users in either a star, ring or tree topology. Reportedly, the PACX 200 can also be used with the PACX 2000 to support up to 25,000 subscribers.

The firm says the switch can be used as a gateway to X.25 public packet networks, digital transmission services, IBM network environments and dial-up lines. The unit also supports integral modems, multiplexers and data-over-voice modules.

The PACX 200 contains a node control logic board and is capable of supporting up to 16 microprocessor-based interface modules equipped with RS-232-C and CCITT V.24/V.28 electrical interfaces. The modules run self-diagnostic tests and report network problems to a system console. Front-panel LEDs report critical problems while a log of system activities and diagnostic information is supplied from a listing port.

Configuration options include breaking attached terminals and personal computers into up to 32 calling groups whose access can be limited to certain network resources. The system can also be configured to support up to 32 receive call-only service groups including computer ports, multiplexers, modems and printers. Devices can be classified into both calling and service groups.

The system supports several layers of password security. Passwords can be required to log on to the PACX 200. Additional passwords may be required to log on to individual attached devices.

The PACX 200 can also be con-See **Switch** page 27

TCA NEWS

## Case uncloaks expert system

**BY JIM BROWN** 

New Products Editor

SAN DIEGO — Case Communications, Inc. unveiled an expert system last week at the Tele-Communications Association show that is reportedly capable of configuring its DCX multiplexer networks.

The expert system, the 5010ES-DCX, is a software add-on for the Columbia, Md.-based Case Communications' 5000 series network management systems.

Based on Carnegie-Mellon University's OPS-83 artificial intelligence software application development tool, the package reportedly checks user input against a knowledge base to reach conclusions on how to configure DCX multiplexer networks. The package was written in C language and compiled with an OPS-83 compiler.

The package runs on Unix-based Convergent Tech-

nologies, Inc. minicomputers supplied with Case's 5000 series. It prompts users to enter the options and services to be installed on DCX 840 networking and DCX 850 switching multiplexer nodes.

The DCX 840 and 850 network nodes are fed with up to 240 channels from other DCX multiplexers and then establish multiple composite links. With feature cards, the units support asynchronous and synchronous communications and interfaces to various public and private networks.

The 5010ES-DCX uses Case's proprietary inference engine to invoke knowledge base rules to evaluate input and respond to the user with either more questions or a list of alternatives headed by the package's best choice selection. The package makes subsequent decisions and suggestions based on options chosen by the user.

The package will also store several different types of network configurations and evaluate what equipment would be needed to support each alternative.

According to Art Alberding, Case's director of product marketing, the knowledge base giving the system its expertness was developed by the firm's U.S. and UK-based expert system teams.

The teams programmed the 10,000 lines of code and See **Expert** page 26

#### ► APPLIED DATA RESEARCH

## ADR unwraps local net application builder

BY MARY PETROSKY

West Coast Correspondent

NASHVILLE — Aiming to extend its software systems to allow sharing of data between mainframes, local-area networks and departmental computers, Applied Data Research, Inc. (ADR) last week introduced Ideal-Escort, a fourth-generation software tool for the development and execution of departmental applications on local-area networks.

The Princeton, N.J.-based company made the announcement during its users group's annual meeting here. President Joseph Farrelly also outlined future product directions, which include support for IBM's LU 6.2 and enhancements to the company's electronic mail software to support IBM's VM/CMS and Disoss. Both of these capabilities should be available in the first quarter of 1987, Tony Percy, ADR's director of product planning, told *Network World*.

Ideal-Escort is designed to help users develop departmental processing applications that support data sharing between networked and stand-alone IBM Personal Computers. A link from the departmental level to ADR's Datacom/DB mainframe data base management system (DBMS) is also provided. ADR has designed the software so that one or more personal computers on the network act as data base servers, with other personal computers communicating with the server.

Supports IBM's

Token-Ring

Network and

PC Network

through

Netbios. ??

"We're seeing the industry move toward decentralization," said Alan Polk, Ideal-Escort product manager. "It makes sense to keep data where it has originated and is being manipulated."

Currently, ADR provides for the uploading and downloading of records from the mainframe to the server but is planning to give users the ability to interact dynamically with the mainframe, Polk said. Ideal-Escort currently supports IBM's Token-Ring Network and PC Network through Network Basic I/O System (Netbios). Although ADR has concentrated on testing Ideal-Escort with these two networks,

the software should be able to run on other networks that support IBM's Netbios, Polk said.

Ideal-Escort pricing starts at \$1,500. The product includes a micro-based development workstation, a structured fourth-generation language similar to ADR's mainframe Ideal and a relational multiuser DBMS. Security features include control of access to specific data bases and applications that can run against those data bases. Z

#### Expert from page 25

over 700 rules of the knowledge base around the functions of the DCX multiplexer line and after interviews with several Case network engineers and technicians.

The system assists in preparing efficient network topology. It provides users with reports on the physical and logical network layout as well as the best routing methods and services for data transmission.

#### Lists software options

The package also supplies operators with the list of software options to be loaded into the DCX 840 and DCX 850 nodes.

Depending on the size of the network, it could take one week to two

months to manually configure a DCX multiplexer network, Alberding said.

"Unless you have your own expert in the configuration of a network, you may redo your configuration several times as you change options and conceivably make errors in configuration," he explained.

The \$15,000 product is aimed at trimming that length of time for network managers who reconfigure networks between five and 10 times a year or for managers just creating a network.

"Over the next two years, as we evolve additional products in the expert system series line, we plan to address generic configuration systems," Alberding said. 2

## These innova companies have p Network Pro

AT&T, Bell Labs, Standard Oil, U.S. Sprint, American Express, Honeywell, IBM, McDonnell-Douglar of Boston, Burlington Northern RR, Citco, Dow Chemical, Citibank, Gelco Corporation, Eaton Kenw Telephone, Goldman Sax, Monsanto, NASA, Nike Inc., Quaker Oats, RJ Reynolds, Rolm Corporation, Hanard University, Boeing Computer Service, Texaco, AT&T Telephone

Harvard University, Boeing Computer Service, Texaco, AT&T Tele-type, Hughes Aircraft, MA/COM, Norand, Siemens, E.I. Dupont, Delta

Today's high tech field service forces asked us to develop the ultimate data communication field service instrument. It had to contain all the instruments a field technician needs to solve a service problem on the first call. It had to be rugged and require no training, yet have the power of the big expensive boxes. We developed the Network Probe, the world's first fully integrated,



#### NETWORK COMMUNICATIONS CORPORATION

9600 West 76th Street Minneapolis, Minnesota 55344

(612) 944-8559 EasyLink Telex No. 5106011221 NCC PROBE UQ



#### ► NETWORK MONITOR

## Tellabs introduces net monitor software

Pull-down menus widen options.

LISLE, Ill. — Tellabs, Inc. recently announced software to monitor networks that use the company's data communications equipment. The 320 Network Monitor package is geared to network managers and technicians using Tellabs' 32-channel 330 Dataplexers, 32-channel 331 Xplexer switching multiplexers or 128-channel 430 T-plexer T-1 multiplexers.

The package runs on an IBM Personal Computer AT with a Color Graphics Adapter and Microsoft Corp.'s Xenix System V operating system. The package features pull-down menus that allow the operator to select a total view of the network or isolate a single network node, link or even one channel.

Installed at central sites, the package passively monitors net-

work operations and collects data from up to 250 nodes on a Tellabs network. Data collected includes the number of calls made, the call destination and how long the call lasted. The package also keeps track of alarm frequencies.

According to Tellabs, the alarms are displayed in color code with red being the most critical condition, such as a lost network node or line. Alarms displayed in yellow pinpoint conditions that may need further attention, such as high error rates in transmission. The blue alarm display indicates conditions that may not need correcting, but that a network manager may want to track, such as an address-not-found message.

Statistical information is stored

in a data base. The data base can be searched for preparing calling reports, event frequencies and historical alarm reports. The package can be configured to print out reports on an automatic basis or on demand.

The \$2,500 package was field-tested at United Telephone of Indiana, according to Tellabs. 72

66 The package
passively
monitors

network

collects data

from up to 250

nodes on a

network. ??

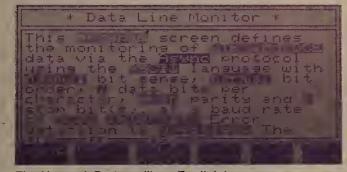
## tive high-tech it the power of the be to work.

M, Pac-Tel, Eastern Airlines, Ford Motor Company, Xerox, Paradyne, Sperry, Visa, Arco Chemical, Bank Computer Identics, General Motors, Conoco, Kimberly Clark, PPG Industries, RCA Inc., Continental emical Bank, Pepsi-Cola, Chase Manhattan Bank, Control Data, Stanford Telecommunications, Comsat, Target Stores, EDS, EXXON, Fujitsu, General Electric,

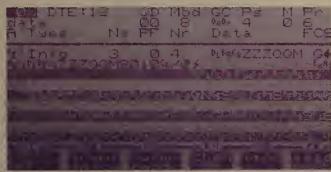
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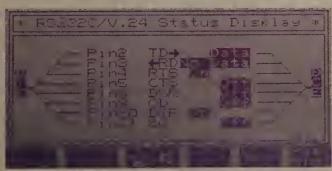
handheld system of instruments designed to increase the efficiency of anyone involved with computer or data comm service. Today, hundreds of service organizations are utilizing the power of the Network Probe family of instruments. Find out why these corporations have chosen the Probe over conventional testers. You'll be in good company.



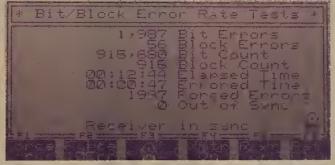
The Network Probe utilizes English language menus with soft-key driven selections. Its non-volatile memory remembers everything so you don't have to.



The Probe can monitor all standard protocols, as well as fully decode frame and packet level information for advanced protocols such as X.25 and SNA.



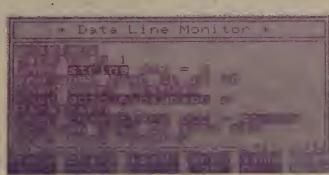
The RS-232 Lead Status Monitor displays the interface control lead status and provides advanced alarming capabilities.



The Bit/Block error rate instrument runs all standard patterns to check out communications links, modems, and multiplexers.



The powerful DVOM section can operate as a data recording Power Line Monitor, a continuity tester, and measures VAC, VDC, Ohms, and dB level.



The powerful programming language of the Probe allows any user to set up special test routines that can be stored and reused with a simple key stroke.

#### Switch from page 25

figured to place devices seeking connection to a single resource into a first come, first served queue. Devices needing immediate access to resources can be given priority over an already connected device.

The system's operating system is loaded from dual 3½-inch floppy-disk drives on the front panel. System configuration and management is performed through menu-driven packages accessible from attached terminals or personal computers.

The Gandalf-supplied interface modules include the ASM 2081, which supports 16 asynchronous channels with control signals operating at up to 19.2K bit/sec. The ASM 2082 module supports 32 asynchronous channels with no control signals operating at up to 19.2K bit/sec. Also supported are the LDS 2120 eight-channel asynchronous modem operating at 4.8K bit/sec over distances of up to three miles, the LDS 2123 eightchannel asynchronous modem operating at 19.2K bit/sec over distances of three miles, the DOV 2640 eight-channel data-over-voice module operating at 19.2K bit/sec asynchronously and 64K bit/sec synchronously and the GLM 2518 dual eight-channel multiplexer operating at asynchronous speeds up to 19.2K bit/sec and synchronous speeds up to 64K bit/sec over distances of 1½ miles.

The base unit comes with a central processor, two 3½-inch floppy-disk drives, operating system software and an eight-subscriber interface module. Pricing ranges from \$3,995 to \$6,000.

The \$250 RM 3120A modem operates in full- or half-duplex for distances of up to 2½ miles at a speed of 19.2K bit/sec or for five miles at a speed of 9.6K bit/sec. The modem card is autoequalized and autophased and operates in either point-to-point or multidrop environments. 2



# SOMETHING BRILLIANT JUST HAPPENED TO DATA TRANSMISSION.

Introducing Public Data Network\* from the Bell Atlantic Network Services Group. A startling communications development that's just made other interactive data transmission modes seem all but obsolete.

Packet Switching goes public.

Public Data Network offers the benefits of packet switching—through the telephone network—at speeds up to 9600 bps. By batching data into electronic "packets," Public Data Network is ideal for "bursty" applications like order entry, billing, information processing, credit approval, reservations, ticket sales and claims.

Suddenly, there's a more efficient way to move data.

Our Public Data Network is, without a doubt, the most efficient way to move interactive data. Period. What's more, rates are usage-based—dramatically lower than dedicated line costs.

Introducing automatic protocol conversion.

And because Public Data Network supports X.25 and asynchronous protocols, it's the perfect link between dissimilar data processing equipment. Like office and home computer terminals and multiple data bases. It also opens the door for electronic banking and electronic shopping and a long list of other interactive electronic subscription services.

A host of advanced network solutions.

In addition to Public Data Network, the Bell Atlantic Network Services Group provides an array of customized services to precisely match your communications needs.

From voice circuits to a variety of digital data services including High Capacity Digital Service and fiber-optic-based High Capacity Lightwave Service, we offer full duplex dedicated and switched digital data transmission at speeds ranging from 300 bps to 560 megabits. On a point-to-point or multi-point basis.

We're the customized network services experts.

Without optimized network transmission capabilities, your communications system is handicapped. That's where we come in. By applying our most valuable asset—our network expertise—we can unlock your system's potential, adding value through increased operating efficiency.

Contact your Account Executive, or call toll-free 1 800 843-2255, extension 14.



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\*Service Mark of Bell Atlantic Corporation.



#### Products Services

#### 100-user voice message system

**Brooktrout Technology, Inc.** announced a voice messaging system that supports up to 100 users.

The V-Mail 220 is a stand-alone, computerbased unit that plugs into the telephone system. Line cards connected to a telephone system digitally record, store and play back voice messages accessible any telephone through touch-tone commands. The system consists of a microcomputer, two speech I/O channels, a 20Mbyte disk drive and multitasking software. It supports two telephone lines and storage of up to 11/2 hours of messages. Message storage is expandable to 31/2

The V-Mail 220 can be configured as an open system, where anyone can call in and leave private messages, or as a closed system, restricted to assigned users. The system supports assignment of personal identification codes that ensure message privacy. Users can send the same message to an entire calling list. The system also reminds users of messages waiting and forwards messages to another telephone number at user-defined times.

The V-Mail 220 system costs \$9,900.

Brooktrout Technology, Inc., 173A Worcester St., Wellesley Hills, Mass. 02181 (617) 235-3026.

#### Async line driver runs at 19.2K bit/sec

An asynchronous line driver that extends the distance over which RS-232 terminals or microcomputers can communicate was introduced by **Prentice Corp.** 

Designed for campus environments, the **DLD** is a full-duplex modem operating at up to 19.2K bit/sec. It extends an RS-232 cable's communication distance by 2 3/4 miles.

The DLD plugs directly into a terminal or microcomputer over either twisted-pair wire, male and female data terminal equipment or data communications equipment interfaces.

The telephone interface accepts either a standard RJ-11 jack or a four-posi-

tion terminal board.

The DLD reportedly meets the Bell 43401 stan-

dard at up to 9.6K bit/sec and the CCITT V.24/V.28 recommendations.

The DLD is priced at \$84. Prentice Corp., P.O. Box 3544, 266 Caspian Drive, Sunnyvale, Calif. 94088 (408) 734-9810.

#### Micro-based synchronous modem

**Astrocom Corp.** has introduced the **EQL 2000**, the company's first synchronous microprocessor-based modem.

Using 24-gauge wire, the modem can be programmed to transmit at speeds of 4.8K bit/sec over 11 miles, 9.6K bit/sec over eight miles, 14.4K bit/sec over seven miles or 19.2K bit/sec over 6½ miles.

With 20-gauge wire, the EQL 2000 can transmit up to 20 miles at 4.8K bit/sec. The unit is equipped with a Z-80 microprocessor employing a proprietary algorithm that automatically compensates for the vari-

## When you need a system the sum of its parts: Count

To maximize the availability of your data communications network today—especially multinode T1 networks—you need a system that's even greater than the sum of its parts. At GDC, we know it's not just one part, but every part working together that makes your network a success.

Putting that knowledge to practical use has made GDC the leader in megabit multiplexing, with the largest installed base of private T1 networking products. We have maintained our leadership position with MEGANET, the ultimate service for cost-effective networking and control. It's the only solution that adds products plus services to equal a total networking system. A system that offers the broadest, most compatible line of products with built-in flexibility that work together to fit your particular communications requirements; from sophisticated multiplexed or switched multi-node T1 networks, to simple local area access.

Even more importantly, MEGANET includes comprehensive service and support with extensive people management capabilities for installation and training. With MEGANET, it all adds up to a total networking solution you can count on.



Multiply your wide area networking capabilities. GDC's software-based MEGAMUX\* II.

a fourth-generation multiplexer, multiplies your multi-node T1 networking like never before.

It represents 10 years of GDC leadership in T1 multiplexing. It accommodates up to 16 aggregate links, with aggregate rates up to 2.048 Mbps. It includes an autoframe feature to maximize efficiency of bandwidth allocation in multiple node, multiple aggregate networks. It uses the same data and voice channel cards as GDC's MEGAMUX® PLUS and KILOMUX® PLUS multiplexers to provide flexible, compatible and cost-effective configuration. And it incorporates redundancy and diversity switching to ensure reliability, with preprogrammed alternate routing in case of line failure.

With three types of voice channels, plus centralized control and management via GDC's NETCON<sup>®</sup> Network Management System, MEGAMUX II is the next step to higher level networking.

Network flexibility that branches out to every area.

A truly flexible communications system extends

the reach of your network in every direction, including the latest technological developments in packet switching. With our GEN\*NET\* family of concentrators, and our GEN\* PAC X.25 PAD access devices, you have your own link to a packet-switched network. For high-speed, high-density applications, they offer the most economical, reliable way to connect geographically dispersed computers and terminals.

#### Eliminate network errors with greater accuracy and reliability.



It's a fact that 75% of the major telecommunications carriers in North America have standardized on GDC data sets for

internal use and resale. Why? Because our analog, digital and down-line programmable data sets offer greater performance, reliability and cost-effectiveness. They give you the broadest selection available for switched and private line networks. And they incorporate many features to help eliminate costly and timeconsuming errors.

In addition, they include GDC's exclusive DataCommonality modular packaging to reduce spares and simplify operation and maintenance. The same plug-in circuit card can be used for both standalone and rackmount units; front only access provides for ease of installation, quick changes and adjustments. And you can upgrade efficiently and cost-effectively within a limited network area, easily moving from lower to higher data speeds or from dial-up—switched network—to leased line operations.

#### Products 2 Services

ous wire gauges and line lengths.

The Z-80's nonvolatile memory stores all modem operation options.

All modem operations and parameters can be controlled from master front panel switches and LCDs, or they can be down-line loaded.

The EQL 2000 modem is priced at \$695.

Astrocom Corp., 120 W. Plato Blvd., St. Paul, Minn. 55107 (612) 227-8651.

FOC-T1 extends **T-1 transmission** 

RAD Data Communications, inc. announced a fiber-optic converter that exthe transmission distance for dedicated links

operating at T-1 speeds by up to three miles.

The FOC-T1 connects to the transmit and receive side of multiplexers transmitting at the T-1 speed of 1.544M bit/sec or the Conference of European Postal

Telecommunications rate of 2.048M bit/sec.

It changes the electrical carrier signals to optical light signals for transmission over a dual fiber-optic cable. The device reconverts the light signal to an electrical signal at the receiving multiplexer.

The conversions are transparent to the multiplexer. The FOC-T1 can be either current-powered or use an external power supply.

A single FOC-T1 is \$499. RAD Data Communications, Inc., 40 N. Van Brunt St., Englewood, N.J. 07631 (201) 568-1466.

#### Package makes PCs graphics terminals

Grafpoint announced a software package that turns personal computers into Tektronix, Inc. 4115 graphics terminals.

The Tgraf-15 package is designed to allow users to access mainframe and minicomputer graphics packages to create up to 64 graphics windows. Depending on the color graphics board used on the personal computer, Tgraf-15 can display images in 256 colors on a 1,280- by 1,024-bit resolution screen. It also supports graphics output to a Tektronix color ink-jet printer, an Epson America, Inc. MX/ FX 80 monochrome printer or Epson JX80 color printer.

The Tgraf-15 costs \$1,995.

Grafpoint, 4340 Stevens Creek Blvd., San Jose, Calif. 95129 (408) 249-*7951*.

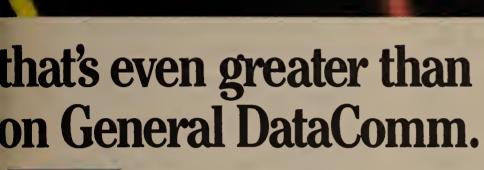
#### **Equinox doubles PBX** line board capacity

Equinox Systems, Inc. doubled the capacity of lines supported on its data private branch exchange series.

The new 48-Line-RS Board accommodates 48 asynchronous RS-232 connections, twice the number of interfaces on its previous board. The new board bumps the number of lines supported by its standalone or rack mountable DS-15 data PBX up to 1,320 lines.

The 48-Line-RS Board costs \$3,600.

Equinox Systems, Inc., 12041 S.W. 144 St., Miami, Fla. 33186-6108 (305) 255-3500.





Add greater economy and efficiency to your local area network.

The range and flexibility of

GDC's products give you the ability to expand your local area network to greater distances at even greater speeds—extending it from desk to desk, building to building, city to city. By integrating our network management and diagnostic control capabilities, you can tie your local area network into a higher level system worldwide and still control it from a centralized point.

Together, our products cover the full range of local area and wide area networking applications. From our data sets and DATX™ data-over-voice products that provide the ultimate in simplicity and economy by offering plug-in installation and operation, Data-Commonality packaging, and an automatic equalizer that adjusts to changes in line transmission; to our more sophisticated multiplexing and switching equipment.

We've got the solution to managing and controlling your network.

With GDC's **NETCON** family of Network Management Systems, you have the total solution to maximizing your network's operational efficiency.



NETCON gives you unsurpassed multi-level control over a wide range of facilities; digital network architectures, multiplexing systems, data sets, and local area networks. It provides comprehensive, sophisticated network management from a single centralized operating center. It assures total network availability with continuous surveillance; instant alarm, restoral and management reporting; and unparalleled diagnostic testing and control. And it provides inbound diagnostics and pre-equalization by individual drop on multi-point services.

Designed for maximum flexibility and total service, NETCON helps you meet the challenges of ever-changing applications and requirements while assuring total network availability. And its compatibility allows integration without obsoleting existing equipment.

There's no end to what invest in T1

high-capacity systems and their associated data communications networks, you expect much more than reliable products. With GDC's MEGANET, you get all the network service and support capabilities as well as a full range of products, that you'll ever need.

we can do

for you.

When you

MEGANET manages your network with greater economy and efficiency. It addresses the multiple vendor problem by offering a total, single vendor capability. It addresses the changing technology problem by offering the most complete, technologically advanced products in the industry. And it addresses the network responsibility and control problem by controlling it from a single source.

Indeed, with MEGANET, you have a total solution to all your networking problems.

To find out more, contact **Product Information Depart**ment, General DataComm, Inc., Middlebury, CT 06762 1299. Or call 1-203-574-1118 Ext. 6456.



### Opinions

**LOCAL-AREA NETWORKS** 

MICHAEL DURR

#### Sidestepping the disk shuffle

Running a multiuser data base application can often justify the need for a full-function local-area network. Bringing the application on-line, however, can present some unique problems.

Many personal computer users have their first encounter with a multiuser environment through a local-area network and a multiuser data base. With this introduction, all of the multiuser issues — information sharing, security and data integrity — suddenly take on tangible significance.

If you're already using a data base management system (DBMS) on a stand-alone personal computer, your application will probably need some modification when you put it on a local-area network.

For example, to allow more than one person to update the data base at a time, the data base application must perform record locking.

A record lock prevents anyone from changing a record or data base entry while another person is changing that same record or entry.

When the first person's update is completed, the record is unlocked and made available to other users. Locks are performed automatically, without user intervention, but the application must be programmed with locking instructions to enable this.

Most multiuser DBMS packages require that the user go through the application manually, determine where a lock is needed and insert it.

A few packages, such as Revelation from

Durr is public relations manager for Novell, Inc. in Orem, Utah.



Cosmos, Inc. in Seattle, have smart application generators that write the locking instructions for the user as an integral part of the application.

Even with these packages, if the user adds any subroutines in the DBMS' programming language, the locking statements have to be added manually to the subroutines.

Field-level security, or field locking, is another useful multiuser feature, although not as critical as record locking.

Each record contains several information fields such as name, address and telephone number. Some fields should be available to everyone, and some might need restricted access.

Access to specific fields can be granted or denied to each user through field locking. For example, in a company with an employee data base, many people may need to work with this data base.

However, you would probably want to restrict most of those people from seeing or changing sensitive employee information,

such as pay rates. Entry screens can be designed to keep users from altering or reading data in the record when their security levels are not high enough.

Field locking is not usually included as a basic feature of micro DBMS packages, but it can be added in any of several ways. Third-party developers may offer DBMS application generators that include field locking.

Alternatively, you can program field locking into your application by using the programming language of the DBMS.

A third way to provide field-level security is to split the data base.

General information is placed into one file, and the sensitive information goes into the other file. The files, which could be stored in different places on the network, are linked together when programming the data base application.

Linking two files is accomplished with key fields and pointers. A key field is a unique identifier associated with each record.

Usually, that means that you simply number each record.

Associated data is kept in the second data base file and is keyed to the appropriate number. Pointers are also kept in the second data base file. These tell the data base how to find the first data base file and how to link the information properly.

When users with general access go to the data base, they will see only the fields stored in the first data base file. To see the sensitive fields, users must have access rights to the second data base file, and those rights are controlled by the network operating system.

See **DBMS** page 43

#### **APPLYING TECHNOLOGY**

JAMES CARLINI

#### Tools of the trade

Years of experience have taught carpenters and electricians that they can benefit by learning the trades of others and applying these skills to their own specialties. By extending their fields of knowledge, skilled workers can make themselves more indispensable and their businesses more profitable.

This kind of philosophy, however, is lacking in the information and communications technology areas.

Hardware and software are being developed faster than managers can find ways to apply them. Many of the software-based tools that have been developed, tested and proven at the end-user level have

Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

only been implemented in a fraction of their potential applications.

Computer-aided design and manufacturing (CAD/CAM) systems, synthesized voice, cellular radio, voice-recognition systems and bar code technology are just starting to be applied to fields that were not targeted as part of their initial market.

CAD/CAM systems were traditionally used by architects. Another use that has emerged is for property management because CAD/CAM information can provide a detailed record for existing buildings.

Bar codes, traditionally used for retail inventory, are also being used to track large items such as a marina's boat inventory. Managers are taking the cellular radio out of the car by bringing cellular phones to meetings, construction sites and other areas where a telephone jack is unavailable.

Some companies fail to focus on implementing new technologies because upper management thinks it is too big a project to apply these new tools to their trade. Unfortunately, these companies may find competitors have used new technologies to broaden their market share and enter new markets. The wise competition will pass them by, as it passed blacksmiths and buggy whip manufacturers.

Corporate executives in all industries must become more aware of the many new computer- and communications-based tools they can apply to strengthen their companies' products and services.

Large companies would be wise to form internal committees to oversee the evolution of applied technologies. Those committees should foster the development of new technologies within the organization, and they should utilize outside services, such as voice mail services, to help solve business problems.

Jewel Building Maintenance, Inc.'s use of telemarketing to promote its building maintenance service in Chicago is a good example of how a company can apply new technologies to its business.

"We need to apply high technology to our industry," says Donald Bergman, Jewel's president. "By using telemarketing to gain access to potential clients, we can pinpoint our mix of services to the demands of the market."

Jewel is also using computers to manage its office cleaning and maintenance services. Representatives bring a portable computer to the job site, input customer information and immediately give the prospective client a price.

Eventually, Jewel wants to computerize ongoing aspects of its jobs, such as labor scheduling and cost tracking. The next long-term step for the company will be to explore the use of automated systems, such

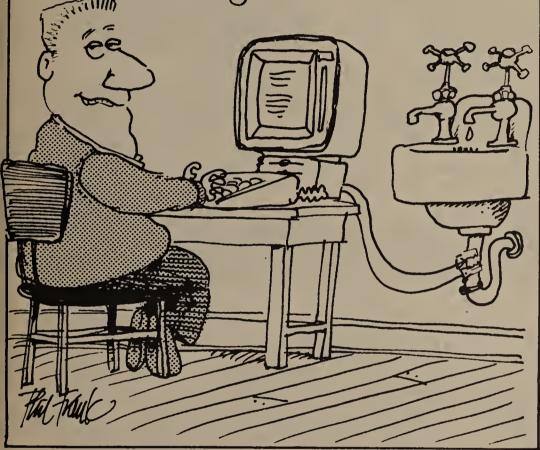
See Tools page 43

### Opinions

#### ►TELETOONS — By Phil Frank

## TELECOMMUNICATIONS AROUND THE WORLD #36

To compensate for their unreliable telephone network, researchers in Albania have taken the lead in the development of teleplumbing.



Tools from page 32

as robotics, to perform some maintenance jobs.

This awareness of how to apply the tools of technology to a company's trade is lacking in many industries.

Experimentation with technology and the use of pilot studies must be viewed by top management as an investment in the future.

If someone is given an electric saw to cut wood but is not shown how to turn it on, the amount of wood he will cut will probably be less than if he used a handsaw. Situations similar to this have occurred during the implementation of new corporate computers and telephone systems.

Proper training is important after the decision has been made to install a new technology; there are no shortcuts. A lack of training can quickly lead to the failure of the application.

Without it, the application's impact on productivity may be negative rather than positive and, in some cases, may actually damage

the momentum of the business.

Many managers have implemented new electronic telephone sets only to find that the user longs for his old telephone.

"Where are the improvements?" users complain. "The old set was comfortable and manageable. The new sets are too complex, and the function keys are too cryptic."

At one company, a new voice mail system was installed and misused as a dictation machine. One manager said he thought the voice mail system provided the means to leave full-length reports for others without the assistance of his secretary's typing.

Such confusion arises because the users were never sold on the new system. The tool was placed in front of them with little, if any, training.

Leading-edge companies will not remain on top in their industries if they are using trailing-edge technology.

The future belongs to those companies that have the foresight to expand their high-tech toolboxes.

MANAGEMENT STRATEGIES

**CHARLES ROBBINS AND GREG CIPRIANO** 

## Bell-wether of net control

The hoopla over network management may make some users believe that communications managers can sit back, relax and let the magic of technology keep their networks up and running.

But today's networks are more complicated and vulnerable than in the days of low-speed analog lines, and network problems are becoming more difficult to diagnose and repair.

Many of the systems in the marketplace today don't have the level of in-depth test capabilities that are required to address multivendor, multicarrier environments.

Managers must have the capabilities to diagnose and isolate network problems, thereby working toward permanent network restoration.

Every vendor talks about its unique network management capabilities and the "total" solution, and there are many benefits that network management systems offer. However, most users are constantly challenged by one primary problem: How to maximize network availability?

In many companies today, there is a trend to use the sexy new color graphics network management system with its full gamut of user-oriented features and functions as a panacea.

Fancy graphics, color highlights and menu-driven software are all major improvements over earlier systems. They are important, but too many users and vendors lose sight that along with these enhancements, there must also be additional enhancements to the basic diagnostic and restoration capabilities of these systems.

Typical sales pitches for new systems state that they will provide the tools needed to plan and manage the network. They promise to make workers more efficient and control the number of staff members required to service a growing network.

Managers like to hear this type of talk. It helps them justify major equipment purchases, and it makes them think their companies have kept up with the technology. But they shouldn't forget about the basics.

Robbins and Cipriano are principals of Telecom Resources, a division of Strategic Market Trends, Inc. in Stoughton, Mass.

History is the best teacher in understanding the basics of network management. It is not a new concept at all; it has its origins in the predivestiture Bell System.

Faced with the problem of maximizing network availability for its users, the Bell System developed its own technologies and capabilities for managing its network.

There were two primary factors that enabled the Bell System to identify and isolate network problems quickly. First, there was a network management philosophy that required integral test functionality be incorporated into all levels of the network.

Second, Bell operations staff in the central office environment were highly trained in network troubleshooting and restoration.

Most of today's network management systems are equipped to help with some aspects of the problems that need to be resolved. These systems have excellent alarm monitoring and reporting capabilities that help identify problem areas.

They also support a full range of restoration capabilities to enable the network to stay on-line with backup facilities. For example, net management systems have borrowed from the Bell testing experience in areas such as enhanced analog parameter measurements using a 1,004 Hz test tone for leased-line testing.

There is a definite need to offer more in-depth diagnostic capabilities in future network management systems, like those in the Bell System. This can only be accomplished by integrating the test features and functions into the network components and associated management systems. Some vendors are already moving in this direction, offering datascope and test equipment features integral to their modem devices.

However, some of the most advanced network management systems are surrounded by some of the least experienced operations people. There may be too much reliance on technology in these cases and not enough hands-on experience and training of the operations staff. Managers must remember that these people are ultimately responsible for the availability of the network.

See **Bell** page 43

#### NETWORK WORLD

#### **Features**

September 29, 1986

Is the pit passe? The introduction of communications technologies is increasing the speed with which securities transactions are made, extending the hours of the trading day and increasing the volume of interexchange trading. On-line market action may eventually woo traders away from the chaos of the trading floor. Page one.





Encounters of the electronic kind Teleconferencing is no longer a toddler technology, but it has yet to catch on among users. While vendors pitch electronic meetings as the savior of the corporate travel budget, users are wary of the technology's impersonality. Page 37.

The enhanced services tango

The FCC's Third Computer Inquiry has telecommunications carriers and users dancing to a couple of new tunes: Comparably Efficient Interconnection and Open Network Architecture. While these policies may simplify competition for vendors, users may find their choices and their bills — more complex than ever.







#### FEATURE FOCUS



**Traders** are reacting to market trends at T-1 speeds.

#### **Continued from page 1**

The key to successful trading is the ability to recognize and respond to market trends. Communications facilities, such as digital circuits, private branch exchanges and personal computer data base links, increase competition between stock exchanges by extending the hours they are able to trade, determining who the exchanges are able to trade with and increasing the volume of trading activity. And, of course, the broker who is able to react quickest to market changes often comes out ahead.

"Five years ago," says Dan McGuire, data communications manager at the Chicago-based Mid-

west Stock Exchange, "you would put a ticker up on the wall and give a trader a phone and pad of paper [and] he would be happy." Now, traders want multiple phone lines and terminals that provide realtime access to all the major exchanges plus on-line access to upto-the-minute information about breaking news that may affect the

"Our members put forth a lot of money each year to make sure we are shoving and pushing to keep them on top of the information environment," McGuire adds.

#### Speed: the name of the game

Large retail brokerage houses, such as Shearson Lehman Brothers, Continued on page 36



From page 34

Inc. and Dean Witter Reynolds, Inc., use either 9.6K bit/sec or 4.8K bit/sec dial-up or dedicated leasedline circuits to route their orders di-

rectly into an exchange.

Sophisticated communications tools, such as optical readers and local-area networks, speed up order execution and heighten an exchange's appeal to the larger retail brokers looking for faster order turnaround time.

"It now takes just a few seconds to make a trade," McGuire says. "It used to take from 15 minutes to half a day, depending on the customer, what firm he was going through and the size of the trade.'

Stock exchanges are using communications tools to increase order processing efficiency, which is driving down the cost of processing broker orders and providing an incentive for retail brokerages, such as Shearson Lehman Brothers, to trade with other exchanges.

Although many large retail brokers automatically route their orders into specific exchanges, they

66 The New

York Stock

Exchange has

been slow to

implement

new tools. ??

have the option of sending orders through any regional exchange.

Adding communications tools to the stock industry is no different than automating any other industry.

Digital circuits and PBXs are frequently used to shuttle data back and forth across trading some

floors, just as they shuttle data in any other business. And the brokerage community is as concerned about service quality and quick response time as the manufacturing industry.

Some stock exchanges, such as the New York Stock Exchange and the Midwest Exchange, are considering local-area networks or already have them on their trading floors. But other exchanges avoid local nets because some communications managers claim they are prone to delays.

"We would only consider using a local network internally," says Douglas Moore, communications manager for the Trumbull, Conn.based National Association of Security Dealers Automated Quotations

"We guarantee our users a response time of two or three seconds. Local networks are unreliable. If data comes to brokers in five or six seconds, they are annoyed."

Adopting technology

Although most regional stock exchanges are automated to some degree, few exchanges have become as reliant on communications tools as the Midwest Exchange. McGuire says that trading applications are written for Digital Equipment Corp. VAX/VMS and Tandem Computers, Inc. computers.

Data transmission is facilitated by a Decnet Ethernet system and a

**6**Stock exchanges are using communications tools to increase order processing efficiency, which is providing an incentive for retail brokerages to trade with other exchanges. ??

separate 6000-line, Intecom, Inc. PBX is wired for both voice and data traffic.

The Ethernet and the PBX operate independently to provide network redundancy. "In a worst case scenario," McGuire observes, "we will not go out of business if our PBX or local network fail."

McGuire says the exchange is also decentralizing its processing powers by tying its terminals to a DEC MicroVAX rather than to its mainframe host computer. "By eas-

> ing the processing work load of the mainframe in one area, we can provide our members with several additional types of services," he claims.

The Midwest network was designed to handle peak loads that typically occur when the market opens each morning plus about a

50% cushion to accommodate bursts of data traffic. During the peak trading hours, the exchange may handle as many as 15 to 20 transactions per second.

However, the majority of the day levels off to eight or 10 transactions per second.

Using the PBX and local network, both the brokers and their customers are sent messages and printed verifications of their trade within minutes. The exchange uses private 9.6K bit/sec data circuits to broadcast market quotes and accept orders from other U.S. stock exchanges and brokerage houses.

The Midwest Exchange is considering bringing other regional exchanges on-line and customizing inhouse data base services. For example, Midwest market specialists currently utilize a specialized, in-house stockbroker information service when issuing stock quotes internally and to other exchanges. McGuire says customized in-house services eliminate members' dependence on general stock information provided by a national service.

Information services for stockbrokers usually come in the form of data bases, called market data retrieval and analysis systems, that have sprung up only recently and are provided by companies such as Quotron Systems, Inc. and Wang Financial Information Services Corp.

"Our own product would produce a faster turnaround on a quote," McGuire explains. "Both

Quotron and the Midwest Stock Exchange may display quotes for IBM. However, the two numbers may not match. In a busy market, if the Midwest terminal is running several seconds ahead of a Quotron terminal, it gives us an edge.'

Unlike the Midwest and other smaller, regional stock exchanges, the New York Stock Exchange, which handles 85% of all securities trading, has been much slower to implement new communications tools. Approximately 240 million shares are moved by the New York Stock Exchange each day over a combination of dial-up, dedicated and T-1 lines.

Communications for the New York Stock Exchange and the American Stock Exchange are handled by the jointly owned Securities Industry Automation Corp. (Siac), which also acts as a nonprofit clearinghouse for regional stock exchanges. Data is sent from Siac to the exchange floor via coaxial cable or fiber-optic links.

The bulk of data for both exchanges is transmitted over 9.6K bit/sec, 4.8K bit/sec data circuits or over a T-1 carrier. Voice traffic is

from

data at both ex-"Our changes. data transmission needs are just too great to run voice and together, data even over T-1, says Jim Primavera, director of communications engineering

separated

Like the New York and Ameri-Exchanges, can

Nasdaq relies heavily on its data communications links to provide up-to-the-minute information to brokers. However, Nasdaq is an electronic exchange that doesn't have a physical trading floor. It relies exclusively on its 200 leased 2,400 bit/sec multidrop lines that link over 3,000 terminals in Trumbull, Chicago and San Francisco.

Data integrity issues

Nasdaq's Moore says that increased network automation also increases the importance of issues such as disaster recovery and security. Nasdaq users have access to one of two security levels. One level lets users look at stock prices on terminals. The other level requires tighter security because it lets sellers and buyers of stocks update prices and other information in the

system. "Security is always an issue," Moore says, "but data is not necessarily confidential. changes are more concerned with hackers changing prices.'

The Midwest Exchange processes customer orders on its internal system, which feeds off of dedicated circuits from brokerage houses. George Chapman, voice communications manager at the Midwest Exchange, says circuit transmission is constantly monitored for both security and quality assurance.

And because crash is a word that no broker likes to hear, most automated exchanges have decentralized networks and are building redundant systems. Nasdaq currently reconfiguring its network by expanding its operating sites from three to seven centers. A mainframe back-up facility is also being built in Rockville, Md.

At both the New York and Midwest Exchanges, all critical private lines are redundant. At the Midwest Exchange, all critical data connections are supported by two live circuits. If one circuit fails, the other line can handle the combined traffic. Communications links each have a dial backup, and Chapman says the exchange also has redundant computer hardware, including hot backups for the VAX system.

'We have no single point of failure," he says. "If a piece fails to operate, we use an automatic backup or the hot backup. We're back in business within 10 minutes."

The advent of global trading

Perhaps the most significant result of increasing automation in the stock market is the imminence of a 24-hour, global trading day. U.S.based stock exchanges are now

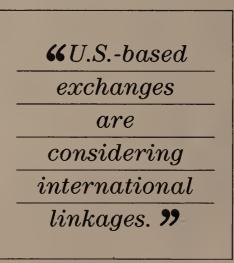
> considering international linkages, just years ago such connections were nonexistent.

In 1984, the Chicago Mercantile Exchange established a link with the Singa-Monetary pore Exchange. Other linkages connect the Chicagobased Midwest Stock Exchange

with Toronto and the Boston Stock Exchange to the Montreal Exchange. A futures linkage currently connects Montreal; Sydney, Australia; Vancouver; and Amsterdam, so customers can trade gold on a 24hour basis.

Officials at the New York Stock Exchange have publicly stated that they would like to play a leadership role in establishing a global exchange. In fact, Siac is currently testing circuits between an international security clearing corporation and the London Stock Exchange.

Chapman says there is no doubt increasingly sophisticated communications technology is the driving force behind international linkages: "Error-free communications and relatively inexpensive equipment will help make a global market possible."



# Encounters of the electronic kind

BY H. PARIS BURSTYN

Special to Network World

Teleconferencing has yet to achieve its potential, despite the high hopes of vendors that are dying to convince users of its virtues.

Whether through telephones, computer messages or video cameras, electronic conferences bring groups of people together while they remain in physically separate locations. But while these technologies, collectively termed teleconferencing, have been available for several years, they have failed to capture the interest of many users.

In theory, teleconferencing provides a corporate tool to save time and money through the use of a telecommunications system that can be shared among three or more people at two or more locations. Audio, computer and video teleconferencing techniques each deliver

Burstyn is a senior staff member of the World Telecommunications Information Program at Arthur D. Little Decision Resources in Cambridge, Mass. unique benefits, and each carries its own set of problems. But they all must overcome the same obstacle — their relative impersonality.

### Impersonal problems

Even with the potential travel cost saving and the advent of improved technologies that significantly reduce the cost of teleconferences, many users are reluctant to hold meetings with people whose reactions are abridged by technology.

During face-to-face meetings, information is conveyed nonverbally, often through gestures and other body language in addition to facial expressions.

The importance of the meeting and the amount of money involved in the final decision are factors working to encourage people to hold face-to-face meetings. Managers with access to teleconferencing facilities often seek the slightest excuse for an in-person meeting rather than convening a teleconference.

Notwithstanding the social barriers that have been the foremost

obstacles to widespread use of electronic meeting venues, teleconferencing technologies are more widely available today than ever before.

As costs come down, they will be even more convenient to use, and users will become familiar with electronic meeting techniques. As a result, habitual behavior in the workplace may change to include more electronic meetings. However, this attitude reversal will take years to develop. Old habits die hard.

### Advantages of teleconferencing

Teleconferencing can reduce travel time and the time spent in meetings. As a result, the time spent in meetings shrinks, and managers gain time to hold additional meetings or accomplish other work that otherwise would not have been completed.

Travel accounts for the greatest share of corporate meeting expenses, but it entails other costs that don't calculate into dollars and cents.

Managers traveling between Continued on page 38

From page 37

meetings are unavailable for consultation on other matters, and only a small part of travel time itself can be used productively.

Limiting travel budgets ameliorates part of the problem but can restrict the amount of information presented during meetings, thereby threatening the manager's ability to make well-informed decisions. When applied appropriately, teleconferencing can bring together all the expertise necessary for well-informed decisions.

This is not to say that teleconferencing will replace all meetings that require travel; it cannot and should not. Rather, it should allow better management of travel schedules, while permitting corporations to bring together all the members of the decision-making team.

Additionally, because a teleconference involves little or no travel, there is no limit to the availability of support personnel or material. Audio and videoconferences can be augmented with facsimile machines or electronic blackboards, which add a textual dimension to the conference.

First meetings are usually not appropriate for teleconferences, nor is the last meeting to close a major deal.

Successful teleconferences usually involve people who already know each other and are meeting to discuss routine matters.

The four basic meeting functions that best lend themselves to teleconferencing are information transfer, problem solving, idea generation and opinion exchange.

With experience, the range of meetings can expand to include almost any topic. Intermediate steps in negotiations can be handled through teleconferences, as can stages of long-term projects.

### Audio conferencing

Audio conferencing, the most economical form of teleconferencing, is suited for simple, relatively short meetings in which speech is necessary and sufficient to accomplish a clearly defined set of objectives.

Audio conferences require much simpler accommodations than video or computer conferences. Although audio conferences can be supplemented by document transfer devices, such as facsimile machines, they are not necessary, whereas they are almost mandatory for a full-scale videoconference. Audio conference rooms need only audio terminal equipment, telephone sets, microphones, loud-speakers and so-called bridges.

Bridges link the sites participating in any teleconference. This equipment can be owned or leased by companies that frequently use teleconferencing, or capacity on a central office-resident bridge can be arranged with a telephone call to the interexchange carrier.

Bridge technology has become so affordable that it is relatively easy to dial a central number to set up an audio conference with locations around the world. However, it can become extremely difficult to tell who is talking from which location.

One example of an audio conferencing system is AT&T's Alliance Teleconferencing Service, which allows users to establish a conference of up to 59 voice and graphics stations through a push-button telephone or with operator assistance.

The bridge control features enable the customer to add other stations, transfer conference control to another station, restore a station that has been disconnected, terminate the conference or access an operator for assistance.

AT&T offers Alliance teleconferencing as a dedicated service for customers who use it regularly. In this case, the bridge can store up to 200 names with their associated primary and secondary telephone numbers and can dial them simultaneously at a prearranged time — a feature called "blast-up."

### Computer conferencing

Because computer conferences involve primarily nonsimultaneous conversations, they require ongoing, long-term discussions to exchange detailed information for applications such crisis as management or research. Many researchers at universities, government agencies and other institutions use computer conferences to share results and conclusions with colleagues carrying out similar work.

Computer conferences today are much more practical than when they made their debut in the early 1970s. With the advent of personal computers, it is now much easier to participate in such systems.

Conferees can compose their correspondence off-line and then upload to the meeting. They can also download meeting minutes to their hard-disk- or floppy-disk-based systems. From there, users can review the notes at their convenience and avoid the expense of doing so on-line.

Bulletin boards on time-sharing services have a lot in common with computer conferences. Members of a conference are assigned passwords that enable them to sign onto the system and enter a "public space" where the conversation takes place.

Most computer conferences focus on a specific topic, and members' contributions are stored chronologically in this public space. Some conferences allow individual participants to exchange private correspondence to supplement the public discussion.

These conferences offer two major advantages. First, they usually take place over a long period of time, thereby allowing for well-considered discussion.

Second, because all discussion is stored in computer memory, people who aren't able to access the meeting for a few days or weeks can catch up on what they missed.

Some computer conferencing systems allow members who sign on simultaneously to chat or exchange messages interactively by typing in responses to each other's statements.

However, most computer conferences take place asynchronously; that is, participants enter their

comments in a central repository that is accessed at different times by fellow correspondents. The participant with the original message must reaccess the system at a later time to sample responses.

This nonreal-time conversation takes a little getting used to, but the system provides an ongoing, fully up-to-date conference record, which can be indexed and then searched by key word, subject or speaker.

Perhaps one of the most famous uses of computer conferencing occurred during the Three Mile Island nuclear disaster. At the time, staffs of many of the operating nuclear reactors and federal regulatory agencies were linked in a computer conference that allowed them to exchange advice on how to handle the emergency best.

Like audio and videoconferencing, computer conferencing offers clear-cut advantages for group communications. Yet no commercial venture has been very successful in this area.

Jacques Vallee, a far-sighted pioneer of electronic communications, started Infomedia Corp., a California company that was primarily responsible for linking the nuclear experts during the Three Mile Island conference.

Unfortunately, this company did not succeed commercially. Participation Systems, Inc., a company with roots at the Massachusetts Institute of Technology but located in Winchester, Mass., has been bravely struggling along for a number of years, but has yet to succeed on a large scale.

The reason that no commercial computer conferencing venture has flourished may be that ad-hoc computer conferences can be set up rather simply by participants.

Professors at Tufts University in Medford, Mass., and their associates at institutions around the country wrote their own software and now merely dial up one anothers' computers to exchange drafts of, and comments on, research papers. There may be a well-developed "underground" network of computer conferences, but the commercial use and opportunities appear limited.

### Videoconferencing

The videoconferencing market is littered with the remains of failed ventures that hoped to cash in on a market pioneered by AT&T with the 1964 debut of the Picturephone.

AT&T's Picturephone Meeting Service slowly faded away for two principal reasons. First, users were reluctant to leave their desks and travel to a central meeting room. Second, building a corporate videoconference room was too expensive for most companies.

Cost is still a major obstacle to widespread use of videoconferencing. A fully equipped videoconference room requires microphones, loudspeakers, a computer and printer, access to a photocopier, coder/decoder, room controller, cameras and monitors.

In addition, companies can install options such as full-motion

cameras, facsimile machines, videocassette recorders, electronic blackboards and film-based projection systems that make long-distance video meetings appear to be local affairs. But the cost of bringing such high-tech convenience to a meeting room can approach \$250,000.

Cutting costs by eliminating equipment can impair the convenience and quality of videoconferences. Slow-scan, freeze-frame video delivers periodic images that provide participants with illustrations, or snapshots, of their meeting counterparts.

This technology can save expenses because the equipment is less sophisticated and transmissions require less bandwidth. However, the less "real" a videoconference seems, the less likely it is to gain users' acceptance.

The critical hardware element in a videoconferencing system is the video signal compression device called a coder/decoder. While an uncompressed standard television signal requires 90M bit/sec for transmission, the coder/decoders that first brought videoconferencing to private corporations could compress video signals into a T-1 (1.544M bit/sec) digital circuit.

Today, with the advent of switched 56K bit/sec transmission services, the costs of full-motion and freeze-frame video are converging. Coder/decoders that have most recently reached the market can compress the signal into a 56K bit/sec digital circuit. These lines can be dialed up, and they don't require advanced reservations or long-term lease arrangements, such as those for T-1 lines.

One system that takes advantage of 56K bit/sec network services is available from Pictel Corp. in Peabody, Mass. Another equipment vendor, Image Data Corp. of San Antonio, Texas, makes a system that transmits still pictures over standard, dial-up telephone lines.

Apparently, even the companies aiming to provide equipment for 56K bit/sec videoconferencing services are finding customers a scarce commodity.

Despite sales to a number of U.S. federal agencies, Widcom, Inc., has filed for protection under Chapter 11 of the bankruptcy laws.

Improved technology will eventually bring videoconferencing to the desktop, eliminating the objection that, "If I've got to travel to a meeting room, I might as well travel to the meeting." However, that hasn't been the case with audio conferences and computer conferences, which can take place from a desktop now. Even so, they have yet to gain widespread acceptance among corporate users.

Rather than force users to take part in teleconferences, a company must build awareness of their availability and encourage potential users to relate teleconferencing to their own communications needs

This tactic, if buttressed by a well-trained support staff, can help to ensure that a teleconferencing system is used frequently enough to justify its expense. 2

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> on Orazine is a senior consultant involved in both data And telecommunications at Network Systems Design in Waltham, MA. He consults with large-scale communications users on the analysis and design of networks, as well as the design and selection of PBX systems. He is also the author of the firm's monthly client newsletter.

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► REGULATORY REVIEW

# The enhanced services tango Regulators are tripping over each other as they come to grips with the FCC's Third Computer Inquiry.

















### BY CORRINE M. WIGHTMAN

Special to Network World

When government regulations stifle the development of new products and services, a capitalistic society must change its policy. In the realm of U.S. telecommunications policy, change is afoot now in the form of the Federal Communications Commission's Third Computer Inquiry.

To determine whether the regulations imposed on AT&T and the Bell operating companies were stifling the availability of enhanced services, the FCC began investigations for Computer III in August 1985. The resulting report and order, issued in June 1986, is a 177-page document that provides a glimpse into the collective regulatory mind of the FCC as well as a historical view of communications policies.

### **Unclear** impact

Unfortunately, Computer III does not shed much light on the regulatory future, nor does it dramatically loosen the chains on AT&T and the BOCs. It doesn't de-

Wightman is president of Technologies Management, Inc., a communications consulting and tariff advisory service located in Winter Park, Fla.

fine what constitutes enhanced services, and it doesn't even guarantee that a new range of services will be made available. However, Computer III does state that the old rules of the First and Second Computer Inquiries do not necessarily apply to the new technological environment.

The only immediate change is that Computer III allows AT&T to offer integrated enhancements to basic communications services through its AT&T Communications, Inc. subsidiary. Furthermore, AT&T Communications and AT&T Information Systems are allowed to share facilities for the provision of enhanced services.

AT&T can now offer information services that are based on services embedded in its network. The carrier mentions in its Computer III comments that one such enhancement could be credit card and check clearing services, which might be based on embedded information retrieval, and store-and-forward capabilities. In addition, future customers may be able to leave voice messages or electronic mail in an AT&T electronic mail box for later delivery to one or several recipients.

Computer III also concludes that the BOCs should be allowed to offer unregulated, enhanced services without establishing separate subsidiaries. However, BOC entry into the enhanced services market is still blocked by the 1982 antitrust settlement with the Department of Justice and the resulting Modified Final Judgment.

The Modified Final Judgment refers to "information services" rather than the FCC's "enhanced services." It defines these services as "generating, acquiring, storing, transforming, processing, retrieving, utilizing or making available information which can be transmitted." By contrast, the FCC lacks even an adequate internal definition of enhanced services.

With the exception of a sevenyear prohibition on electronic publishing, the Modified Final Judgment freed AT&T to enter the information services market while prohibiting the BOCs from providing information services or manufacturing equipment. But both the FCC and the courts have been very flexible in defining which services fall into the enhanced services and information services categories. For example, both BellSouth Corp. and Bell Atlantic Corp. currently offer protocol conversion, which seems to fit the Modified Final Judgment definition of an information service. However, the courts decided that protocol conversion was not an information service, Continued on page 42

From page 41

and the FCC, which is undecided on how to define protocol conversion, did not object.

During 1985 and 1986, the FCC eliminated AT&T's separate subsidiary requirements for the provision of customer premises equipand limited enhanced services, and proposed eliminating them for the BOCs. Clearly, the original intentions of the court and earlier FCC policies are being abandoned. The door is open for the BOCs to file for waivers from the court and the FCC, permitting them to participate in a wide variety of businesses.

Regulatory strings

In addition to the Justice Department limitations imposed on AT&T and the BOCs, Computer III attaches other strings to their provision of enhanced services. Comparably Efficient Interconnection (CEI) is an interim competitive safeguard that the FCC plans to impose on dominant carriers that offer enhanced services. This safeguard, which is intended to prevent regulated companies from competing unfairly, requires that regulated carriers file service-specific CEI plans for approval with the FCC before offering enhanced services.

CEl plans would describe a proposed service, itemize the basic services underlying the offering and offer basic service connectivity to competing service providers. If the regulated company wants to use abbreviated dialing for access to its new service, for example, abbreviated dialing access would have to be offered to competitors.

FCC staff members can only speculate on the exact nature of the CEI plans that the BOCs will develop. For example, the BOCs may or may not offer competitors floor space for switches and other equipment in their central offices. According to FCC procedures, it will be up to competitors or customers to raise a flag if they feel the proposed arrangement is not "comparably efficient."

CEI plans will only be required until the carriers develop approved Open Network Architecture (ONA) plans, which are required by Computer III and must be submitted by Feb. 1, 1988. ONA is not a set of specific FCC parameters. Rather, it is a request for BOC innovation in redesigning their networks into unbundled building blocks called basic service elements (BSE) that can be offered on a tariffed basis.

The FCC expects the operating companies to work with enhanced services providers and industry standards forums to develop a set of BSEs that can be used in a wide variety of enhanced services.

BellSouth has already assigned a task force to work with Bell Communications Research, Inc. (Bellcore), Digital Equipment Corp., Wang Laboratories, Inc., IBM and others toward a practical ONA plan. Standards organizations are expected to be active in defining acceptable ONAs to ensure future availability of compatible access features such as Integrated Services Digital Network.

Gene Davis, operations manager of regulatory support for BellSouth Services, says that, to a degree, ONA is a natural evolution because, "We already provide some elements of the network as currently unbundled features."

He lists the first breakdown of major BSE categories as loop access, interoffice channels, switching and software-based features associated with the central office, such as automatic number identification and call forwarding/call waiting. Network users are already familiar with this level of network disaggregation and with the tariff confusion caused by fragmented services.

These categories could be broken down still further into dozens of components. The FCC, the common carriers and corporate users all voiced concern during the Computer III proceedings about fragmenting the network.

Just as buying a car piece-bypiece is more expensive than buying a complete automobile, users fear that using a piecemeal approach to procuring network services will increase the cost of a complete network.

Providing enhanced services vendors with access to network components introduces an additional cost to the user of basic network services. Davis compares ONA to equal access: Both concepts were conceived to enhance competition and must be nondiscriminatory, unbundled and tariffed with averaged access charges. "There are significant costs to providing equal access. We all pay part of it,' Davis observes. For example, to provide equal access, the BOCs must upgrade their central offices. The costs of these upgrades then go into the rate base, increasing costs for basic services.

Despite those costs, BellSouth and other BOCs support the concept of ONA and the Computer III process. There are two likely reasons for their support. First, the Department of Justice and the FCC have suggested that ONA might lead to reconsideration of the Modified Final Judgment prohibition of BOC-provided information vices. Second, an abundance of network capacity will turn transmission into a commodity in the future. To grow, basic network providers must develop features that make use of that capacity.

### The lock-in factor

If the BOCs and AT&T offer integrated enhanced services, they will stimulate use of their networks and develop a proprietary environment. Voice mail, for example, not only competes with other types of telephone calling, it also competes indirectly with overnight delivery services, the postal service, memo writing and so on, thus stimulating new network usage. A customer using voice mail who is integrated into the AT&T network would be locked-in to using AT&T for calls they might previously have completed via MCI Communications Corp. or US Sprint Communications Co. This kind of proprietary environment is exactly what AT&T and

the RBOCs could use to overcome direct competition.

The FCC argues that enhanced services have been stifled because "structural separation has deprived the public of innovative services that could be provided efficiently through AT&T's and the BOC's extensive communications networks." They also assert that business customers settle for services that do not best serve their needs because "systems solutions" are not available from basic service providers.

Since divestiture, communications managers have struggled to re-create end-to-end service. Although most managers resent the time and effort that dealing with multiple vendors requires, many agree that the proliferation of products and vendors has brought the cost of service down. The FCC is trying to find a middle ground for the provision of enhanced services by allowing the BOCs and AT&T to offer a total package, while requiring that they make components of that package available to competing vendors.

Michael Blackwell, president of Async Voice Message Service in Columbia, S.C., has reservations about AT&T and RBOC pricing of enhanced services. As a former Bell System rates and tariffs administrator, he knows that "it is inherent for AT&T and the BOCs to fail to identify all the costs of providing any service." He sees ONA as a wholesaler environment with a hidden agenda to attract and maintain high levels of network usage. The danger is that the customer who uses only basic services will be subsidizing the cost of providing enhanced services.

This fall, the Department of Justice is expected to issue a report on whether the remaining restrictions of the Modified Final Judgment should be relaxed or eliminated. The Computer III decision establishes a regulatory framework to manage BOC entry into the information services market, should the court determine that the environment is sufficiently competitive to warrant lifting the constraints.

### Congressional thumbs in the pie

Congress also has an interest in shaping the telecommunications industry. Sen. Robert Dole (R.-Kan.) has proposed legislation that would turn the remainder of the Modified Final Judgment provisions over to the FCC for administration. A spokesman for the senator insists that the Telecommunications Act of 1986 is not related to Computer III or influenced by it: "Computer Inquiry III is a product of rulemaking. If this bill becomes law, the FCC would issue a set of regulations identical to the provisions of the Consent Decrees that are still in effect. This would merely speed up the approval process for RBOCs to go into other lines of business [by having all policy coordinated by one organization]."

However, the FCC has announced its intention in Computer III to allow the BOCs to enter the information services market, contradicting the provisions of the

Modified Final Judgment. Concern that the FCC will relax or eliminate the Modified Final Judgment restrictions has prompted the Senate Commerce Committee to propose amendments to the Dole bill that would dilute the power of the FCC to alter these restrictions. But regardless of its form, the bill is unlikely to pass in this session.

The Dole bill, Computer III and the recommendations of the courts are all indicative of the pressure for change in the way enhanced services are offered. This pressure may be market driven, or it may be marketing driven. BellSouth's Davis says that enhanced services are "like microwave ovens — you need to educate consumers why they need one." Blackwell agrees that all vendors' sales of enhanced services will benefit from the big advertising budgets and customer education provided by AT&T and the RBOCs.

While the FCC is pushing for more competition in communications and information services, it also has an obligation to keep the national network whole. That means that regulators have to be concerned about the health of AT&T and the RBOCs — they cannot be allowed to fall behind in a competitive market. On the other hand, it is a delicate balancing act to attempt to move the communications industry toward open competition when the biggest players are still guaranteed winners.

Computer III is one more FCC step toward deregulation. But while the decision simplifies regulation for carriers, it only makes things more complex for consumers, who are faced with confusing tariffs and bills and a plethora of product and service choices. Consumers who do not take advantage of the new services generated by deregulation will see only these bad effects.

Computer III will make the regulatory maze worse before it gets better. The next few years will tell whether the FCC's vision of a fully competitive telecommunications market is practical. Until then, new state and federal tariffs for CEI will emerge. Some states will protest the hand of the federal government in their jurisdictions. Also, the determination of access charges is likely to be complicated by CEI tariffs.

Computer III does not answer all the questions it has raised. Supplementary proceedings are being held to establish policies concerning the categorization of protocol conversion as a basic or enhanced service, the extent that Computer III should apply to independent telephone companies and the treatment of customer proprietary network information.

Now that the FCC has determined the old rules are not satisfactory, new rules must be designed. As these rules emerge, network planners and managers will see a steady flow of changes that will affect the way they do business with network providers. Computer III establishes a framework around which regulatory issues will revolve for years to come. Z

DBMS from page 32

When users with the proper access rights request data from the second data base, the data base application links the two data base files, and complete records with both sensitive and general data are available.

The ability to link many files into a single data base structure is useful in areas other than security. For example, if your local-area network has been growing, you may have installed several small hard disks. You can create a single large hard disk by logically combining the small disks with the data base application.

Multiuser data bases are often large, with many people depending upon their contents. In this situation, data integrity is critical.

Current local-area network standards, which are endorsed by IBM, Microsoft Corp. and a majority of local-area network vendors, require a file server environment. The local-area network file server manages shared disk storage and guarantees data integrity on networks equal to data integrity on mainframe systems. In other words, in a file server network, users are prevented from simultaneously writing to the same area of disk and, in the process, destroying one another's work.

But simultaneous updates are not the only threat to data integrity in a data base. A DBMS uses a spe66 The ideal protection is to use a system that tracks each entry. ??

cial file to organize and locate data. That file is called an index. If a workstation crashes because of a hardware or software problem during an index update, the data base can be rendered unusable. Indexes can be reconstructed, but it's a long and difficult process.

The user can protect the data base by performing daily backups. However, if the data base is destroyed, all the data entered after the last backup would be lost. Time would also be lost while the backup data base is installed in the system.

The ideal protection is to use a system that tracks each entry or transaction. Such a system maintains a copy of the old index while the new one is being created. If the transaction fails for any reason, the partially updated index is erased, and the data base continues to use the old index. There is no data loss and no downtime.

Transaction tracking systems are available as part of the network operating system, as part of the data base application or as a combination of both. Users that can't afford to have their data base systems fail should consider one of

these alternatives.

The transition from a standalone personal computer to a network environment has little effect on most applications. In most cases, the old word processor or spreadsheet program will continue to work adequately. File locking, which is provided by the network operating system, prevents simultaneous updates at the file level;

therefore, the user's single-user packages get automatic multiuser upgrading when they're loaded onto the network.

But file locking isn't appropriate for most data bases. Normally, several people will want to access the data base simultaneously. To get this kind of functionality, you'll have to install a multiuser DBMS. You should also plan how the data base will be used and who will be accessing which data.

Dealing with these multiuser issues is a little more complex than shuffling diskettes among singleuser personal computers, but the added functionality and efficiency are worth the effort. Z

### Bell from page 33

This means that, no matter what claims are made by assorted vendors offering a total solution, there is no substitute for a highly trained, hands-on support staff. No matter how good a system is, there will always be the need to plan and respond.

### Following the trend

Users may think they are saving money by following the trend to hire a less experienced and less expensive support staff. But the cost of having the network down will quickly expose this false sense of economy.

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tinuing education and training of support staff is a critical factor in assuring maximum network uptime.

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The challenge of communications managers in a complex network environment is to develop a strategy that balances technology and people to maximize the network's availability.

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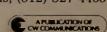
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PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CAR	D.
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My primary areas of activity. Circle ONE only.

I am involved in evaluating communications (data, voice and /or image) products and services:

1. for use within my own company/organization

2. for resale to other companies/organizations

For communications, my primary responsibility is: Circle ONE only.

1. Data Communications

2. Voice Communications3. Both

Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, ClO, VP, Dir. Head of Finance, Admin. Procurement

### Communications Management

Data Communications

21. Management

VP. Dir., Mgr., Head, Chief: Data Communications, including Networks,

Engineering, Design, R&D, Application Development

22. Supervisory/Staff Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks.

Engineering, Design, R&D, Application Development 32. Supervisory/Staff

Supervisor, Head: Networks, Design, Analysis, Engineering, R&D,

**Applications Services** Factory Communications

41. Management

42. Supervisory/Staff

MIS/Data Processing

51. Management VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development,

Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of System Design, Analysis, Applications

Others

75. Consultant

95. Other\_

80. Educator 85. Financial Analyst 90. Marketing/Sales

Job Function Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? Circle ONE only.

1. Business Management, Planning and/or Development

Communications System/Network

Management, Planning and/or Development
Implementation and/or Operation

Which one of the following best describes the primary business activity of your organization at this location? Circle ONE only. Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/Communications)

End Users

13. Manufacturer (other than computer/communications)

Finance/Banking/Insurance/Real Estate

23. Education

24. Medicine/Law 25. Wholesale/Retail Trade

26. Public Utility/Transportation
27. Mining/Construction/Petroleum Refining/ Agriculture/Forestry

30. Government: State/Local

28. Business Services (excluding DP/Communications) 29. Government: Federal

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers

43. Manufacturer Computer/Communications Equipment

44. Value Added Reseller (VAR), Systems House, Systems Integrator 45. Distributor

46. DP/Communications Services (excluding consulting) 95. Other\_

In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services? Circle ALL that apply.

Recommend/Specify 3. Approve the Acquisition 2. Identify/Evaluate Potential Vendors 4. None of the Above

Check ALL that apply in columns A and B.

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

Α	В	Product/Services		Α	В	Product/Services
Comput	ers		Tra	nsn	nissi	on/Network Services Equipme
01. 🗆		Micros	18.			Microwave
02. 🗆		Minis	19.			Satellite Earth Stations
03.		Mainframes	20.			Local Area Networks
D C-			21.			Wide Area Networks
	_	unications	22.			Packet Switching Equipment
04.		Communications Processors	23.			Fiber Optic Equipment
05.		Comm./Networks Software				
06.		Digital Switching Equipment	Cor	mm	unica	ations Services
07.		Facsimile	24.			Packet Switching Services
	_	Modems	25.		ŏ	Cellular Mobile Radio Service
09.		Multiplexers	26.			Electronic Mail
10.		Protocol Converters	27.		ö	Enhanced Services
11.	_	Network Mgmt. & Control	28.	_	ŏ	Centrex
12.		Test Equipment	20.	_		centrex
13. 🗆		3270 Controllers				
Telecon	ımu	nications				
14. 🗆		PBXs				
15. 🗆		Key Systems				
16. 🗆		Central Office Equipment				
17. 🗆		Integrated Voice/Data				
		Terminals				

Estimated value of communications systems, equipment and services:

A. which you helped specify, recommend or approve in last 12 months?

Check only ONE in column A.

B. which you plan to specify, recommend or approve in next 12 months? Check only ONE in column B.

6. 🗆 7. 🗆 1. 🗆 \$100,000-250,000 Over 10 million 2. \$5-10 million \$50,000-100,000 8. 🗆 \$1-5 million Under 50,000

\$500,000-1 million 9. 🗆 Don't know \$250,000-500,000

Estimated gross annual revenues for your entire company/institution:

Circle only ONE.

1. Over \$1 billion 2. \$100 million to \$1 billion

3. \$5 million to \$100 million 4. Under \$5 million

Estimated number of total employees at this location: Circle only ONE

Over 5,000 5.100-249 2. 1,000-4,999 4. 250-499 6.50-99

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- 2. Answer all questions
- 3. Sign and date form

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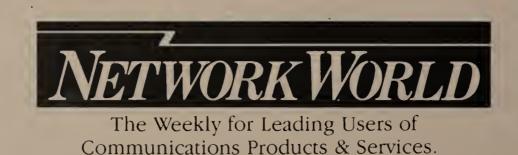
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# Calendar

Oct. 1-2, New York — Voice Processing and the Telephone Industry. Contact: Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07960.

Oct. 2-3, Dallas — Southwest Computer Measurement Group Fall Meeting. Contact: Ellen Robertson, Texas Utilities Services, Inc., Suite 510, 2001 Bryan Tower, Dallas, Texas 75201.

Oct. 6-10, Washington, D.C. — Microwave Systems Planning. Contact: The George Washington University Continuing Engineering Education Program, Washington, D.C. 20052.

Oct. 6-10, Orlando, Fla. — FOC/LAN 86: The Tenth International Fiber Optics Communications and Local Area Networks Exposition. Contact: Information Gatekeepers, Inc., 214 Harvard Ave., Boston, Mass. 02134.

Oct. 7-10, San Francisco — DEXPO West 86: The Tenth National DEC-compatible Exposition. Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Oct. 8-9, St. Louis, Mo. — Conference on Relational Data Base Management Systems: DB2 in the Production Environment. Contact: Kathryn Atnip, Washington University, Campus Box 1141, St. Louis, Mo. 63130.

Oct. 8-10, Boston — Internetworking and Advanced Protocols. Also, Oct. 22-24, San Jose, Calif. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Oct. 9-10, Calgary, Alberta — 4th and 5th Generation Data Management Software. Also, Nov. 6-7, Washington, D.C. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Oct. 9-10, Chicago — AT&T in the 1990s: Feast or Famine? Contact: Gartner Group, Inc., 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

Oct. 14-15, Long Beach, Calif.

— Third Annual Western Telecommunications Expo. Contact: GTE, 5225 Wiley Post Way, Lakeside Plaza 2, Salt Lake City, Utah 84116.

Oct. 15, Los Angeles — Localarea Networks: A Comprehensive Overview for Managers. Also, Oct. 21, Boston; Oct. 23, New York; Oct. 28, Seattle; Nov. 6, Washington, D.C. Contact: Ungermann-Bass,

Inc., 2560 Mission College Blvd., Santa Clara, Calif. 95052.

Oct. 15-17, Denver — SNA. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 16-17, Washington, D.C. — IBM, AT&T and Alternate Sources: Strategic Positioning. Contact: Rose Hill, Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Oct. 16-17, Washington, D.C. — Integrated Data Networks (IDN): Fiction or Reality? Contact: Ramcor, Inc., 800 Follin Lane, Vienna, Va. 22180.

Oct. 16-18, Atlanta — Atlanta Computer and Business Equipment Showcase. Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

Oct. 19-22, Boston — Technetron '86: Reaching Our Potential in the Information Age. Contact: International Society of Wang Users, Wang Laboratories, Inc., Mail Stop 1935, One Industrial Ave., Lowell, Mass. 01851.

Oct. 19-23, Orlando, Fla. — 1986 ACD Telecommunications Conference. Contact: Applied Computing Devices, Inc., Aleph Park, 100 North Campus Drive, Terre Haute, Ind. 47802.

Oct. 20-22, Washington, D.C. — Local-area Networks. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 21, Washington, D.C. — MAP: An Introduction. Also, Oct. 22, Chicago; Dec. 9, San Francisco. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Oct. 22-24, New York — SNA Architecture and Implementation Seminar. Also, Nov. 12-14, Boston. Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Oct. 27-28, Bethesda, Md. — The Postdivestiture Tariffs and Their Impact on Large Networks. Contact: Janet Hunter, The Aries Group, Inc., Suite 320, 1500 Research Blvd., Rockville, Md. 20850.

Oct. 28, New York — Telecommunications for Development: Exploring New Strategies. Contact: Telecommunications for Development, c/o Intelsat, 3400 International Dr., N.W., Box 22, Washington, D.C. 20008.

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66 There are

no plans to

beta test the

packet

service. ??

### NETWORK OF THE FUTURE

### AT&T puts net to the test

Users will be able to create ISDN-like nets with existing gear and services.

BY BOB WALLACE

Senior Writer

SAN FRANCISCO — AT&T last week detailed the results of a oneyear, four-city, wideband packetswitched service field test at its Communications Planning Center here.

The carrier also delineated how its customers can use existing equipment and long-distance services to create an Integrated Services Digital Network-like network based on AT&T connectivity specifications.

The wideband, packet-switched service project was one of a series of efforts that may be used to create what AT&T refers to as its Network of the Future ("Is the future in packets?" Network World, July 21). The service, which was termed experimental by AT&T service planners, reportedly allowed voice, data and video signals to be placed in a common packet format and statistically multiplexed over a single

communications link operating at 1.544M bit/sec.

Data packets were interspersed with voice packets by eliminating bits that represented silent pauses common in a voice conversation. In addition, bits representing nones-

sential slices of a conversation were dropped. The combination enabled a T-1 link, which typically supports 24 64K bit/sec digital voice channels, to support 120 voice channels.

Wideband packet interface devices converted voice, data, signal-

ing and video information into a common packet format for transport and routing.

Three of these experimental devices were placed at AT&T locations in San Francisco, San Leandro

and Sunnyvale, Calif. These sites were then linked to a wideband packet switch and an access interface at the company's Pleasanton, Calif., building.

Richard Snowden, service conception director for AT&T Communications, Inc. said the future of the advanced packet technology is uncertain. "There are no specific

plans for use of the technology," Snowden maintained.

There are also no plans to beta test the technology. Snowden also detailed how AT&T customers could realize the benefits of integrating voice and data communications today by

linking either AT&T System 75 or System 85 private branch exchanges at separate locations using a private long-distance T-1 services, such as AT&T's Accunet T1.5 service, to gain ISDN-like capabilities.

In such a scenario, an AT&T 3B5 computer could be linked to the AT&T PBX using the company's Digital Multiplexed Interface (DMI), a T-1 interface for computers. Terminals hooked to one of the company's PBXs could then access that processor using AT&T's Digital Communications Protocol (DCP). DCP integrates voice and data on twisted-pair wire and is said to be similar to the CCITT 2B+D interface.

DCP uses two 64K bit/sec D channels for the transmission of voice or data and an 8K bit/sec D channel for signaling information used to set up each voice or data call. The CCITT specification varies from AT&T's scheme in that it specifies the use of a 16K bit/sec D channel.

The ISDN-like capability explained by AT&T would enable a user to engage in a voice conversation with a second party while at the same time displaying a data file on the user's terminal screen.

An immediate advantage of AT&T's ISDN-like network scheme would be high-speed data transfer. Files could be downloaded to a data terminal from either a 3B2 at the same site or an IBM host at the far end of the Accunet link, using one of the 64K bit/sec channels.

Equitable from page 1

mation Technologies, a department that oversees corporate telecommunications and the company's shared tenant organization, said approximately one third of the department's budget is contributed by tenant services revenue.

The company originally contracted ShareTech — the shared tenant service company offered through joint agreement of United Technologies, Inc. and AT&T — to provide service to The Equitable's corporate headquarters at The Equitable Center located here.

The Equitable leased a modular AT&T System 85 PBX from Share-Tech for its exclusive use.

"I did not wish for The Equitable to be part of a shared system that we did not control," Owens recalled

Other tenants in the Equitable Center were to be serviced by an additional ShareTech PBX.

In 1986, however, United Technologies and AT&T dissolved their ShareTech partnership and the second phone system was never installed, Owens said. The Equitable tenants had been using small key systems, and in some cases, temporarily shared telecommunications facilities on The Equitable's PBX.

With the collapse of their shared tenant provider, Owens convinced senior management to buy the ShareTech switch to provide shared tenant services to The Equitable Center tenants.

The company had some previous experience providing shared services to tenants located in another Manhattan site. "The only reason we weren't providing shared tenant service at The Equitable Center," he recalled, "was because we weren't ready to provide service to

the rest of the company when the original agreement with ShareTech was reached in 1983."

Owens realized that, as long as The Equitable and its 1,600 users already absorbed the fixed communications costs as anchor tenants and his telecommunications department was already in place, the cost of adding a few more telephones and some additional cable would be marginal.

"By using the excess capacity of the PBX, telecommunications staff, our raised floor, air conditioning and backup system," he said, "the out-of-pocket expense was very small. We are able to offer services to our tenants at competitive prices very profitably."

Tenants also benefit from The Equitable's on-site maintenance personnel, who provide timely repair services, including station equipment moves and changes.

Although The Equitable's tenants have required only voice services to date, Owens said his company is positioning itself to provide shared local network services by the fourth quarter of this year.

"The services that are easiest to offer are the ones The Equitable uses today," he said. "But as more tenants move into the facility and their needs unfold, we will be faced with a make, sell or buy decision," he added. "That is, do we have it in our bag of tricks today? Or is the required product something we can develop or buy outside? In a shared environment, the tenant's desire for services will be driven by the cumulative need within the building."

### Cover your fixed costs

Owens said the company has had no trouble finding tenants, which reduces The Equitable's telecommunications costs annually via outside income.

"We proved that shared tenant services can be successful if you cover your fixed costs," he said. "If you don't, the variable cost of providing service is very high."

### RCA from page 1

tions businesses with the formation of the Communications and Services organization, under which all RCA and GE services will fall. Eugene F. Murphy, formerly an executive vice-president with RCA, will head the new organization.

The effect of the reorganization is expected to wreak considerable change as GE takes a long look at the diverse markets in which it competes.

According to RCA, Americom will continue to market services in its three major product areas — business communications services, audio/video services and government network services.

The Private Leased Channel Service is an interstate, leased point-to-point voice/data service. The service's 280 employee support group in Princeton, N.J., was revamped Sept. 19, when an unspecified number of employees were laid off. Customers of the service, which number nearly 1,000, will

have to switch to alternative carri-

RCA Cylix may be rescued in the eleventh hour. Cylix provides interactive data services for high-volume, synchronous data applications. The network currently supports approximately 200 customers, including Purolator Courier Corp., Campbell Soup Co., Dow Chemical Co. and Monsanto Co.

Jim Magruder, vice-president of engineering and operations at RCA Data Transaction Services, said RCA management intends to make a tender offer for Cylix within three weeks.

Brian Eagle, the chief deputy director at Cylix, is orchestrating the takeover and is trying to marshall the aid of other investors.

Although the Cylix network is extensive, serving more than 2,500 locations, Magruder said the operation has been in the red since its inception in 1980.

Forces converged in the past few years that have dulled any compet-

itive edge the company once had as a long-haul carrier. AT&T's longhaul rates have dropped, making Cylix less attractive, and local loop costs have risen.

Cylix's satellite network is C band and uses large shared earth stations, meaning users have to shoulder the local loop costs to access the network.

To ameliorate this predicament, Cylix has invested huge sums to research and develop a Ku-band satellite network, according to Magruder. Small aperture terminals would eliminate local loop problems and increase efficiency, making Cylix more competitive.

But RCA isn't interested. Williamson said the company has another Ku-band solution, operated by a unit of Americom out of Princeton. This service will offer Ku-band, point-to-point, dedicated clear channels at 56K bit/sec and T-1. That, so far, leaves Cylix with a hefty research and development bill and nowhere to turn. Z

### ► ASHTON-TATE

### **Dbase to run on Starlan**

Software compatible with other systems.

**BY JIM BROWN** 

New Products Editor

TORRANCE, Calif. — Ashton-Tate announced last week that its Dbase III Plus and Dbase III Plus LAN pack will now run on AT&T's Starlan local-area network.

Dbase III Plus is Ashton-Tate's multiuser relational data base management system (DBMS) for IBM Personal Computers and compatibles.

Its companion, Dbase III Plus LAN pack, supports network-only access to Dbase III Plus data bases for up to five users on a local-area network. The software also runs on IBM's PC Network and is compatible with Novell, Inc.'s Advanced Netware and 3Com Corp.'s 3+ network operating system Version

1.0.1.

Compatibility of Ashton-Tate's microcomputer DBMS with the AT&T network has been assured, the company said, by close interaction with members of AT&T's technical staff.

AT&T's Starlan is a 1M bit/sec, twisted-pair wire local-area network that supports two to 200 personal computers in a star configuration.

Ashton-Tate, by many accounts, is the second leading maker of microcomputer software in the U.S., trailing the Cambridge, Mass-based Lotus Development Corp. Ashton-Tate recently agreed to acquire Decision Resources, Inc. of Westport, Conn., and is expected to release a line of business graphics packages.  $\square$ 

Fiber from page 17

accelerate the use of fiber in factory floor nets. These devices would probably allow many devices to attach to the lightwave cable without weakening the light signal itself. This type of tap might also house equipment that would be used to retransmit the light signal.

Fiber-optic cable, however, allows users to generate higher bandwidths by changing the electronics at both ends of the cable. To substantially raise the bandwidth on a coaxial system — once the radio frequency channels run out — the

user has to either replace the network or run a second coaxial cable.

Lightwave media does not produce any type of electrical signal, so chances are slim that Radio Frequency Interference will interrupt the light impulses sent down a stretch of fiber-optic cable.

Much of coaxial cable's popularity as a factory networking media comes from the fact that cable television technology is older, well-understood and widely used.

As users become more accustomed to working with fiber, many of their misgivings about the medium will disappear.

### Wang from page 4

receptionist, is also available.

Standard asynch terminals can be linked to a VS through the WBX via twisted-pair using the Eightport Enhanced Asynchronous Device Controller, which can be used for terminal-to-VS links through any digital PBX or RS-232-C net.

A Wios configuration including a WBX and VS costs about \$3,000 per

user. A voice-only configuration for WBX costs about \$550 per user. Integrated voice and data configurations using the WBX cost approximately \$1,200 per user. The Eightport Enhanced Asynchronous Device Controller costs \$5,000. Wang Office/Voice Mail is priced at \$18,500. The WBX-DVX-60 sells for \$25,000. The price includes a fourport DVX-60, but not the WBX.

Link from page 1

riety of personal computer and mainframe applications and supplied inconsistent interfaces.

As the shortcomings became apparent, the hoopla surrounding the products dwindled to a trickle. For the most part, users have become discouraged by product hype, and many have stopped looking at new offerings. Those users are now trying to make do with installed products.

"We haven't seen any interest from our clients in link products," noted L. David Passmore, group manager at Network Strategies, Inc., a Fairfax, Va., consulting firm.

Recently, a handful of vendors have moved to strengthen their link products. These new product incarnations solve some of the crippling problems, but a link panacea does not seem likely in the short term.

Problems with current links stem from the fact that they are rooted in 10-year-old protocols, according to Lee Doyle, senior analyst at International Data Corp., a Framingham, Mass., market research firm. Most products are based on IBM 3270 terminal emulation and merely make microcomputers look like dumb terminals.

The result is that users can transfer screens of data but are unable to perform sophisticated network functions.

"Users don't want to download screens of data," said Rudolf Strobl, senior consultant at Arthur D. Little Co. in Cambridge, Mass. "They want to share information. Current links do not easily perform that function." Terminal emulation products simply enable files to be transferred between the two environments.

However, even simple file transfers can be a nuisance because links are based on older protocols. Dumb terminals do not store much data.

Consequently, protocols that support terminal-to-mainframe connections are designed to poll a

number of terminals quickly and are ill-equipped to support the transfer of large amounts of data. More than 15 minutes may be needed to move a 1M-byte mainframe file to a personal computer. During this time, other users may be unable to work with their applications.

Before a file transfer, a user has to be able to determine the information to be moved. Thus, data extraction tools are required. Most products can only extract data from specific mainframe applications.

For example, mainframe software vendors typically provide application-specific links to personal computers and do not provide the tools needed to extract data from other vendors' mainframe packages. Users have often been unable to get at all the data they may have wanted to work with.

Once data has been extracted, it has to be formatted once in order to be sent to the receiving system and a second time for it to be understood by the target application. Many link products do not supply the tools needed to extract and format data.

Even when the necessary tools are available, they can be confusing enough to discourage users. A user, for example, may encounter one interface when extracting data from an application running IBM's TSO and a completely different interface when taking data from an IBM CICS application.

Taking stock

Stung by slower-than-expected link sales, many vendors have taken note of current shortcomings and are now attempting to rectify the problem. In the last few months, IBM, Tangram Systems Corp. and Micro Tempus, Inc. announced products or groups of products designed to overcome link limitations.

IBM led the way with its June introduction of Enhanced Connectiv-

ity Facilities, a broad set of products and application program interfaces.

The architecture is designed to supply a consistent set of user interfaces to enable microcomputer users to work with data stored on IBM mainframes under the MVS and VM operating systems or the TSO teleprocessing monitor.

IBM's link strategy is built on three software components. Socalled requesters supply users with a consistent interface so they can select and ask for appropriate host data.

Routers include application program interfaces that allow target applications to be brought into the IBM architecture. Servers perform the actual extraction and formatting of host data.

Although it's a step forward, IBM's architecture has its own shortcomings. First, mainframe and microcomputer application programs have to be rewritten to incorporate the new IBM application program interface, called Server-Requester Programming Interface.

Also, laying out the architecture is an expensive proposition because it requires a number of costly components. Further, some of the products will not be put in place until the third quarter of 1987.

Tangram Systems, a start-up company based in Cary, N.C., announced its Arbiter system in June. The Tangram product's chief benefit is performance improvements.

Arbiter works like a host subsystem, similar to IBM's CICS. Arbiter's design enables a user to access host data directly, as opposed to going through something like CICS, which is how most link products access host data.

A beta user of Arbiter reported a 50% performance improvement over an existing link product.

Like a number of other link vendors, Micro Tempus, based in Montreal, has been gradually enhancing its link line.

In July, the company announced Tempus Access, which works with Sterling Software, Inc.'s DYL-270. DYL is a data base extractor that works with IBM Isam, Bdam and Vsam files.

The product also interfaces to data base management systems such as IBM's IMS, Cullinet Software, Inc.'s IDMS/R and Applied Data Research, Inc.'s Datacom/DB.

The product reportedly supplies

the user with a fill-in-the-blanks interface that provides up to 60 variables used to determine what data is to be extracted and where it resides.

### Problems remain

Yet despite recent product improvements, analysts listed a number of shortcomings that plague even these new-generation link products.

Arthur D. Little's Strobl said one missing item is a data dictionary, which would help users locate appropriate data and track data changes.

Security remains perhaps the greatest user concern. Although a number of packages, such as Arbiter, can be integrated with existing security packages like IBM's Resource Access Control Facility, this integration is often cumbersome, and many users would like to see link products include more sophisticated security features.

Another micro-to-mainframe shortcoming is lack of true information sharing, according to Strobl. Users want to do more than extract and download information. They want to extract information, massage it and then distribute it to their colleagues. Current link products do not offer this capability. To support it, they would have to incorporate distribution mechanisms such as IBM's Systems Network Architecture Distribution Service.

Despite product problems, analysts predict that current links will continue to sell for at least two more years.

## Letters:

### The lone vendor

I enjoyed your article on very small aperture terminals in the Sept. 1 issue of Network World, ("Brought back from the brink"), but was greatly disappointed in the lack of acknowledgement of the role Avantek, Inc. has played in the development of this technology. Avantek has delivered in excess of two hundred small aperture terminals to a myriad of users. These users include most of the satellite common carriers, both domestic and international, and a number of prominent end users in the oil, gas and financial services fields.

The technology Avantek employs makes use of its leadership role in gallium arsenide and silicon monolithics. Together, these technologies produce highly reliable components and systems that have been successfully exploited by Avantek for inclusion in its small aperture terminal, which, by the way, has been available on the market for over a year.

The small aperture terminal we provide can handle data rates from 9.6K bit/sec to 1.544M bit/sec and consists of a 1.8-meter antenna, radio frequency transceiver with optional solid-state power amplifiers and a binary phase shift keying modem with rate 1/2 coding. I might add that we are the only company in the world to have successfully deployed a 4-watt solid-state power amplifier in a small aperture terminal.

Andrew D. Poole
National sales manager
Satellite Business Communications
Avantek, Inc.

### Distortion and disservice

Your headline and story about The Network Courier E-mail package for IBM and compatible personal computer local-area networks ("E-mail package for IBM nets gets so-so rating," Network World, Sept. 1) distorted the user's reaction to the product and has done a considerable disservice to both your readers and Consumers Software, Inc., publishers of The Network Courier.

I have confirmed the distorted rendering with the user, who wishes himself and his bank to remain publicly anonymous.

Discussing his reaction to your story, he said, "I evaluated all the available E-mail products for PC LANs and this is far and away the best." Other publications have more accurately recorded his satisfaction with The Network Courier.

Equally baffling was your omission from the story of the major local-area network vendors that have endorsed The Network Courier.

AT&T, Tandy Corp. and Advanced Communications Technology plc in Europe have all licensed The Courier as the standard E-mail program for their network system offerings. The product is reference-sold by Sytek, Inc., Ungermann-Bass, Inc., Univation and other network systems vendors. It has received more such endorsements than any other single local-net application software product.

Why have all of these significant local-area network players adopted this single product as the standard for their system offerings? What have they seen in The Network Courier that your story

didn't even begin to explore?

Answers to these questions would be of tremendous service to the networking community, which is crying out for high quality personal computer local-area network software.

Robert M. Freeman, Manager, market development Consumers Software, Inc.

### An invitation to readers

We do not agree with the conclusion of "On-line tariff services," (Network World, July 28), especially since the article ignores the comprehensiveness of our offering, Q-Tel 1000. Omitted from the review is that our service includes more than privateline pricing.

Q-Tel 1000 also includes pricing for toll, Wats, local exchange and special access, as well as local calling areas, central office and local access and transport area information.

Several facts were inaccurate, including one as basic as our name, which is Center for Communications Management, Inc.

Here are the facts. Q-Tel 1000 does price analog, digital and high-capacity services for all jurisdictions. Q-Tel 1000 presents both carrier-provided access as well as special access rates. Q-Tel 9000 does cover virtually all of Canada, not just parts.

Because Q-Tel 1000 has so many on-line capabilities, we invite the readers of *Network World* to use them all for one day at no charge by calling (800) 526-5307. Jeremy P. Van Pelt Vice-president, sales and marketing CCMI/McGraw-Hill, Inc. Ramsey, N.J.

### TCA from page 2

Inc. and Apple Computer, Inc. teamed up to debut links that connect Macintosh microcomputers to other processors through Northern Telecom's Meridian SL-1 PBX.

Also at the show, Digital Communications Associates, Inc. (DCA) announced the completion of its merger with Cohesive Network Corp.

DCA unveiled a revamped maintenance program and specialized services for its customers, and it offered Netlink T-1 users the option to upgrade to Cohesive's CN-1 or CN-2 lines.

Amdahl Communications Corp., Timeplex, Inc., Micom-Interlan, Inc., Digital Microwave Corp. and Comsat Technology Products headed the vendor corps that introduced data networking equipment at the conference.

Amdahl took the wraps off two additions to its Multistar line of T-1 multiplexers. The new Multistar III supports one or two T-1 links and the Multistar IV supports up to 15 T-1s. Both devices are compatible

with D4 framing and offer time-of-day automatic reconfiguration.

Timeplex introduced a T-3 multiplexer that combines as many as 28 T-1 transmission links over a 45M bit/sec point-to-point communications link. The company also introduced the Minilink/2 Data/Voice Network Exchange, which handles a mix of digitized and compressed voice signals and data signals.

Micom debuted a pair of time-division multiplexers that enable users to multiplex up to eight synchronous data lines over a single 72K bit/sec digital link. The Micom Box Type T offers wideband synchronous time division multiplexing. The Micom Box Type 4 offers asynchronous statistical multiplexing as well as synchronous time-division multiplexing capabilities.

Comsat Technology Products announced a new version of its Starcom very small aperture terminal-based data net service. Starcom Data Services will enable users to connect remote locations via satellite to the vendor's shared hub station in Washington, D.C. \(\overline{\mathcal{Z}}\)

### Highlights from page 6

year pact, valued at roughly \$12 million, with Cable and Wireless to lease capacity on the Cable & Wireless fiber network. John Mattingly, a marketing official with American Satellite, said the fiber capacity will be used to diversify the carrier's network, which consists of Ku and C-band satellites and some fiber-optic cable. The American Satellite network serves 16 metropolitan areas scattered across the nation.

- Despite reports that the company is considering selling portions of its communications businesses, Western Union Corp. announced a packet service that will use PTN-1, the network that serves as a backbone for Western Union's Easylink electronic mail service.
- ITT Communications Services Group slashed 20% off the flat rate component of its Wats service. Customers averaging at least 112 hours per month per line for calls to any cities served by ITT's network will reportedly pay \$1,200 instead of \$1,500 for the service. 2

### MCI from page 2

of corporate development at MCI's Mid-Atlantic Division, which developed the service. Wolaver also indicated that MCI is developing a real-time feature that will allow users to have up-to-the-minute data.

Users at the TCA show cited cost containment as the key reason for their interest in call accounting and network management products. "The primary incentive is to control costs. It's important to us to get the charges where they belong," said Sharyn Barney, supervisor of telecommunications and office systems management for Westinghouse Electric Corp., Sunnyvale, Calif.

Another user cited overall cost control as the reason his company is currently upgrading much of its telecommunications equipment to products that include management and control features.

These factors are the same that push the development of data network management systems. Datatel, Inc. and Paradyne Corp. were two of several vendors announcing data network management systems at the show.

Datatel, of Cherry Hill, N.J., unveiled a network management system for digital data services users and a data link analyzer that provides performance measurement, testing and diagnostics for data communications networks.

The DCP3800 network management system can be used with either standard digital data services or digital data services with secondary channel. The secondary channel provides a conduit for network control information. The DCP3800's system console is an IBM Personal Computer XT or compatible, equipped with a Synchronous Data Link Control interface. The DCP3800 continuously monitors network performance and allows users to test all the drops on a line or choose any drop and activate local digital, local line or remote digital loopbacks.

The DCP2083 Data Link Analyzer III is a bit error test set with operating speeds up to 6M bit/sec, including T-1. It includes V.35, RS-232, MIL 188, RS-422 and bipolar interfaces, and tests synchronous, asynchronous and T-1 facilities, modems, channel service unit/data service units and multiplexers

The DCP3800 sells for \$5,000 per node, and the DCP2083 unit lists for \$4,975.

Network performance measurement is the key function of Paradyne's Pulse, a stand-alone system that monitors network performance by monitoring modems and leased, digital, or dial-up network lines. Statistics on channel utilization and system response time are among the types of information tracked. Pricing is from \$30,000 to \$125,000.

Paradyne also announced a networking option for its 3210 T-1 multiplexer that includes network control of the multiplexers with an asynchronous terminal from a central site. Due to ship in the fourth quarter of this year, the networking option is priced at \$6,500.\(\overline{\overline{\sigma}}\)



BY EDWARD HORRELL

In communications today, it takes more than just good business sense to survive; it requires celestial guidance.



Virgo: The sign of an orderly nature controls those who have installed data switching through private

branch exchange systems.

Virgo represents the concealed fire of the Earth. Quick-moving Virgos love change and variety, but only in an orderly fashion.

In their search for orderly movement of data, users of data switching capabilities are going to be either well ahead or completely on the wrong track.

Surveys indicate that in spite of all the hype, fewer than 10% of PBX lines in use have data switching capabilities.

Instead of asking why, Horrellscopes offers the following tips for users weighing data through PBX systems.

■ Don't feel pressured to have only one information network. The movement of the information, not the number of networks, is the key.

■ Be aware that PBX failures and testing, as well as poorly planned moves and changes, can affect all voice and data.

■ Let applications, not vendor pressure, drive your decisions.





Cosmic catastrophe of the month

Horrellscopes laments the inevitable passing of Ztel Corp., the latest on the PBX startup list of casualties.

This month's catastrophe winner . . . make that loser . . . at one time had all the ingredients thought to guarantee success. The Ztel product itself looked good. It was a PBX built around local-area network technology. And initially, a sound management team appeared to be in place with ample financial support available.

But as so many others have learned, the key to success in this business is distribution. Distribution is the difference between the Big Boys — Rolm Corp., Northern Telecom, Inc. and AT&T — and the smaller guys, which are everybody else.

Distribution is what will allow newer players, such as Intecom, Inc. and Telenova, Inc., to compete in the Big Boys' backyard. And distribution is what Ztel didn't have and

couldn't get.

Other companies with ideas about starting fresh in the PBX business can take a lesson from the Ztel debacle. Insiders report that Ztel is down to a skeletal crew of employees and is on the verge of going under. Last-minute talks are under way with potential buyers in an effort to salvage what's left of this falling star.

Horrell is president of Mitchell & Horrell, Inc. in Memphis, Tenn.



Cancer: This sign hangs over a \$40 million motel deal for AT&T Information Systems.

Cancers have a con-

scientious heart, desiring progress for humanity. Waste, poverty, mismanagement, crime and inefficiency distress Cancers.

That brings us to the motel industry. The 420-facility Motel 6 Corp. recently decided to purchase 40 million bucks worth of AT&T telephone systems, computers and long-distance services. This is the largest deal of its kind in this industry.

The deal is significant for two reasons. First, it marks the beginning of combined marketing between two AT&T units, AT&T Information Systems and AT&T Communica-

Second, it shows that there are indeed lodging institutions willing to spend some money to improve service to customers.

Today the telephone, tomorrow the towels.



**Shooting stars** 

One of the potential buyers of Ztel is Data General Corp., which has wanted to get into the PBX business for some time. For that reason, DG bought the research and development division of United Technologies Corp.'s PBX group, which narrowly missed being a catastrophe itself.

DG now has stated that it intends to bring its own PBX to the market. Big



mistake. It will three take before years end users get a reliable product, one which will meets DG's strict standards for performance.

But don't look for Ztel to wind up in bed with DG. Ztel is too far down the tubes for DG. Rather, a new kid will be acquired by the computer biggie. And that kid is Data Transmission, Inc. of Memphis, Tenn.

Data Transmission has developed a PBX that uses an interesting transmission scheme to allow for implementation of Integrated Services Digital Network standard switching. The switch is being manufactured inexpensively, and DG and Data Transmission recently announced compatibility agreements for joint marketing.

Watch for DG to dump the in-house PBX, kiss Ztel goodbye and walk down the aisle with Data Transmission.



**Libra:** The sign of balance, justice and harmony covers the Bell operating companies' charges for Centrex.

The sign of the scales represents the invisible

bonds that hold together the celestial bodies of the solar system. The North American Telecommunications Association (Nata), however, thinks the Centrex bonds are too tight.

Nata has complained to the Federal Communications Commission that the regional BOCs are pricing Centrex under cost and hiding the losses in other services. The FCC has told Nata to take its problems somewhere else, namely to the states' public service commissions (PSC).

Too bad, Nata. The PSCs are too independent to come to any type of combined decision. This flies in the face of the structure of the BOCs, which are indeed regional in de-

Users should realize that within their states, the PSCs currently reign supreme. Horrellscopes recommends that PSC members - whether they are elected or appointed be known and contacted by users. Let them know of users' concerns, problems and opinions.

Additionally, users should make copies of all correspondence between themselves and the RBOCs. The RBOCs will jump through hoops to keep the PSCs off their backs.







Pisces: The last sign of the zodiac controls the call detail recording (CDR) industry.

Pisces represents the completion of a cycle. This precisely describes the CDR business, which is

beginning to enter its second cycle.

Once considered almost an incidental business by PBX distributors and manufacturers, CDR has become an industry in itself. The use of software for personal computers in conjunction with PBX software for capturing long-distance calls has hit mammoth proportions.

Users should consider CDR as a standalone part of the PBX decision, not as a throw-in. They should insist on sample reports as well as a clear understanding of the capacity of the system being considered.

One final user tip: Check for annual software maintenance charges. For some unexplained reason, these charges seem to get lost in the stars on occasion. Users should make sure they are quoted as part of maintenance charges.









U.S. Leasing is the nation's largest independent company leasing office equipment, medical equipment, fleets of cars, railroad rolling stock, and even airplanes. How did they grow so big? Speed, efficiency, and knowledgeability. In a word, service. So, to increase their speed, efficiency and knowledgeability U.S. Leasing called AT&T.

No longer will a customer have to wait for a U.S. Leasing employee to call her back with information before completing her transaction. No longer will the employee have to leave his desk to seek credit, equipment, maintenance, and contract data from separate sources. Now, with AT&T 800 Service and the integrated voice and data communications provided by AT&T System 85 and AT&T Personal Terminal 510, the U.S. Leasing employee can access all the information from several mainframes and respond to the customer right from the PT 510 screen.

So far, this has meant an increase of 2.5 hours a day per employee at the desk. Time well spent handling customer inquiries, pursuing new business, managing lease renewals, and finding new ways to serve customers better:

U.S. Leasing intends to grow with AT&T, linking more AT&T System 75s and

terminals in their smaller offices, creating a single pool of information. So the whole company can communicate from a single database. AT&T makes all the pieces fit.

To find out how AT&T can help you use communications to achieve your business goals, call us at 1800247-1212.

